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31 October 1980

CHINA REPORT

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CONTENTS

NATIONAL DEVELOPMENTS

Air Raid Shelters Become 'Hotels' for Unemployed Youth, Retired Workers (BEIJING RIBAO, 23 Sep 80)	1
Foreign Countries' Intelligence Gathering Discussed (Yang Baogen; KEXUE SHIYAN, May 80)	2
Briefs Shanghai Science Association	8

APPLIED SCIENCES

'CAMAC' Function Module Soon To Be Mass Produced (Wang Mingguo; JIEFANG RIBAO, 18 Jul 80)	9
Chinese Character Computer Input System Explained (TIANJIN RIBAO, 23 Jul 80)	11
Briefs Remote Sensing Measures Pollution	13
Titanium Dioxide Production	13

SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

Need To Establish Research Development Center Reiterated (Zhou Jijong, Cheng Changye; GUANGMING RIBAO, 1 Aug 80)	14
First National Metascience Research Society Founded in Beijing (Jin Liangjun, et al.; GUANGMING RIBAO, 1 Aug 80) .	17

PUBLICATIONS

Table of Contents of 'DIWEN WULI' No 2, 1980 (DIWEN WULI, No 2, 1980)	19
Tables of Contents of 'KEXUE HUABAO' Nos 2, 5, 1980 (KEXUE HUABAO, Nos 2, 5, Feb, May 80)	21
Issue No 2	
Issue No 5	
Table of Contents of 'JISHU BIAOZHUN TONGBAO' No 3, 1980 (JISHU BIAOZHUN TONGBAO, May 80)	28
Table of Contents of 'KEXUE HUABAO', Aug 80 (KEXUE HUABAO, Aug 80)	30

ABSTRACTS

AERONAUTICS

HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE], No 5, May 80	34
---	----

CHEMICAL ENGINEERING

HUAGONG XUEBAO [JOURNAL OF CHEMICAL INDUSTRY AND ENGINEERING], No 2, Jun 80	37
--	----

ENVIRONMENTAL PROTECTION

HUANJING BAOHU [ENVIRONMENTAL PROTECTION], No 1, 1980	43
---	----

HYDRAULIC ENGINEERING

SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING], Nos 1, 4, 1980	47
---	----

MEDICINE

JIEFANGJUN YIXUE ZAZHI [LIBERATION ARMY MEDICAL JOURNAL], No 2, Apr 80	60
---	----

MICROBIOLOGY

WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA], No 3, Sep 80	66
---	----

MODERNIZATION

XIANDAIHUA [MODERNIZATION], No 9, 16 Sep 80	86
---	----

OCEANOGRAPHY

HAIYANG KEXUE [OCEANOGRAPHY], No 1, 9 Jan 80 88

SEISMOLOGY

DIZHEN ZHANXIAN [SEISMOLOGY FRONT], Nos 3, 4,
26 Jun, 26 Aug 80 90

NATIONAL DEVELOPMENTS

AIR RAID SHELTERS BECOME 'HOTELS' FOR UNEMPLOYED YOUTH, RETIRED WORKERS

Beijing BEIJING RIBAO in Chinese 23 Sep 80 p 1

[Photo caption]



The Jianguomen subdistrict office of Dongcheng District has organized 17 unemployed youth and a number of retired workers to use the underground civil defense structures as the "Jianguo Hotel." Since 28 July there has been a steady stream of customers.

CSO: 4008

NATIONAL DEVELOPMENTS

FOREIGN COUNTRIES' INTELLIGENCE GATHERING DISCUSSED

Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENTS] in Chinese No 5, May 80
pp 5-7

[Article by Yang Baogen [2799 1405 2704]: "Strange Rocks in the Forests"]

[Text] The telephone rang impatiently. The officer on duty at the command post picked up the telephone.

"Sir, we have found a strange rock in this part of the forest. It can grow horns!"

"You try to bring it here as quickly as possible!"

"Yes Sir!"

After 20 minutes, a jeep stopped in front of the command post. Two soldiers carrying a thing wrapped in a raincoat stepped out of the jeep.

"Reporting in Sir!"

"Enter!"

After the two soldiers entered, they placed the thing wrapped in the raincoat on a table.

"Sir, this is the strange rock in the forest."

The officer removed the raincoat. A rock full of mud and mildew was exposed. The smell of damp soil of the forest arose.

"Where are its horns?"

"Sir, they will appear very soon."

"Turn on the radio and recorder and record all signals!"

As expected, after a while, two horns like those on a goat extended from the right and left sides of this mud covered rock!"

The radio received obviously compressed signals.

After 5 minutes, the horns retreated back into the rock.

"Hurry up and send the tape over for analysis and rush back the results. Send this thing back to the rear."

That night, the analysis report arrived. It was written: "After analysis, the content of the tape concerns intelligence of the number, time and direction of tanks, automobiles and personnel that passed through the forest region this morning. It also contains the content of conversation among several walkie-talkies in the forest area."

The thing was sent to the rear to the concerned research institute and technicians used small axes like those used by archaeologists to open it. Ah, the inside was full of various kinds of electronics equipment!

Everything was now clear. This is an

Automatic Surveillance Station.

In 1973, the United States dropped various kinds of surveillance stations of this kind over the battlefields in Vietnam. And they have also been installed along the Sino-Indian border. They are camouflaged as "rocks," "bricks," "rotten wood stumps," etc. The Soviet KGB also used similar types of such equipment to communicate with its spies at various places in the world and to gather intelligence.

This type of automatic surveillance stations consists of a power source, transmitter, ultra-differential search receiver, recorder, a control center with a microprocessor, antennae and an electrical motor for the drive antenna. To conduct surveillance over launching pads of guided missiles, the automatic surveillance station must function continuously for a long time. The energy depends upon an isotopic electrical power source. A wide frequency band is used to receive and gather all signals that it can receive. A subsonic probe is used to measure the important parameters of the guided missile. The automatic surveillance station installed along the Sino-Indian border by the U.S. Central Intelligence Agency uses plutonium-238 isotope as the electrical power source to carry out surveillance over our nation's nuclear tests and nuclear weapons. It utilizes an electromagnetic probe to probe the pulse of nuclear electromagnetism, and utilizes subsonic and seismic equipment to monitor the tests. In combat surveillance, the transmitter uses a sonic transmitter.

The entire function of the automatic surveillance station is commanded by the control center with a microprocessor. It can gather signals for long periods and then transmit all information recorded on the magnetic tape within 3 to 5 minutes. The antennae emerge when information is being transmitted. After the information has been transmitted, the antennae retreat back into the device. The large automatic surveillance stations

of this type are as large as a suitcase and the small ones as small as a fist. It is different from ordinary listening devices. A listening device continuously listens and continuously transmits information. The automatic surveillance station continuously listens but transmits information in pulses.

Then, how does it

Sneak Into the Enemy's Rear?

To conduct "real time" combat surveillance and strategic surveillance, this type of automatic surveillance station has to be sent to the enemy's front, communications hub, military plants, test sites of guided missiles and nuclear weapons, military posts, airfields, government offices of various nations and especially secret agencies.

Balloons or airplanes are frequently used means to drop the automatic surveillance stations. The most effective dropping method is to use a kind of framed balloons (like a bunch of grapes). This type of balloons can continue to function even when it is partially damaged. The airplane flies to a designated location and releases the automatic surveillance station. It drops to the ground lightly by means of a parachute. The parachute is made of special nylon. It can dissolve and disappear in rain or in dew, and it will not leave any trace.

Balloons cannot drop the device from the stratosphere onto target areas far away from the borders and airplanes cannot easily fly into the region, therefore a satellite can be used. In this case, the outer shell of the automatic surveillance station camouflaged as a rock is subjected the same kind of burning and erosion as a comet in the atmosphere. This method is very effective when the target landing site is a desert or a swamp.

Of course, the device can also be placed by man. The U.S. Central Intelligence Agency once used "mountain climbers" to place the automatic surveillance stations along the Sino-Indian border. The Soviet KGB utilized diplomats and specialists to carry out spying activities. A simple "sling shot" can be used to place the small automatic surveillance station on open telephone lines, telephone cables, and secret meeting places. Cleverly camouflaged automatic surveillance stations can even be sent to national agencies and the homes of leaders as "gifts."

After the automatic surveillance stations have been installed, they will begin to gether intelligence information. Foreign spy agencies can continue to receive various types of intelligence information regarding combat strategy and war tactics, and political, economic, national and regional information.

Then, how do they

Communicate?

There are three ways of communication between the automatic surveillance station and foreign spy agencies.

If the device is placed on the border or in the front lines of the battlefield, the relay station can be carried by balloons into the air. The information transmitted by the automatic surveillance station is relayed to the spy agencies.

Or a flying vessel or an airplane can be used for periodic reception and recording of the signals transmitted by the automatic surveillance station, and the tapes are then turned over to the spy agencies.

The second method is satellite relay. The satellite flies over a certain region at a fixed time, and the automatic surveillance station under the command of the synchronous signals from the satellite transmits the information it has gathered to the satellite, and the information is then relayed to the spy agencies. The "pyramid" plan established by the U.S. Central Intelligence Agency utilizes three synchronous satellites to monitor the spy radio stations of various places of the world, and of course they include the automatic surveillance stations!

There is another method that utilizes diplomatic offices as cover to record the information from the automatic surveillance station onto magnetic tape, and the magnetic tape is sent to concerned spy agencies for analysis. This is a means frequently employed by the KGB.

The automatic surveillance station generally uses the comet trail scatter communication, ultra-short wave communication and satellite communication and such methods to transmit gathered information.

The information on magnetic tape gathered from various channels is sent to foreign spy agencies. According to reports, the KGB headquarters in Moscow has 30,000 people using electronic computers to analyze intercepted information on magnetic tapes of several miles long. At the U.S. Central Intelligence Agency, there are also 4,000 people engaged in similar work.

On the basis of normal surveillance, the United States has gained detailed understanding of the electronic systems of the Soviet Union and other nations. The numbers, positions, frequencies, time changes of radars, broadcasts, and television stations of all the places in the world have been charted. With the automatic surveillance stations, the United States has ceased to launch any more fine tuning type electronic surveillance satellites since the beginning of the 1970s.

This type of automatic surveillance station has not ceased to develop, but has become

More and More Aggressive.

On the basis of the rapid development of listening devices, the automatic surveillance station and the listening devices have combined to form a "mother and son type" automatic surveillance system. One American company disclosed this type of system. This company wanted to listen in on the workings of the board meeting of a competitor, and a fly was equipped with a listening device on its back and then was sent into the meeting room through the key hole while the board meeting was in session, and the automatic surveillance equipment received secret information. Modern listening devices are developing towards miniaturization and superminiaturization. A listening device can be placed in several dozen places on a woman, in her purse, hairdress, earrings, rings on the fingers, wrist watch, lapel, buttons, false teeth, and glasses. Listening devices can be made into harmonicas, "gifts," "telephones," and can also be installed in places unnoticed by people such as corners of walls and sides of houses. They can be placed anywhere. Several dozen listening devices were installed in the U.S. Embassy in the Soviet Union. They have become an important means of the cold war. An important means of bugging from superlong distances at present is the use of lasers. The laser is beamed onto glass, walls or rocks. These laser bundles will vibrate slightly when there is sound. Interference techniques are used to interact the emitting laser and the reflected laser and to extract the sound signals. Using the skills of acoustics, one can separate a person's important conversation from very confusing noises. This makes it difficult for listening devices to handle. The automatic surveillance station is used as the "mother" to gather the information transmitted by the "offspring" listening devices scattered at various places, and the automatic surveillance stations are used to communicate with the intelligence agencies. Using this method, the conversation of a nation's leader can be bugged via satellite.

Because the surveillance satellite cannot continue to carry on surveillance over a certain area, and because it covers a large area, because the selection of signals is difficult, and because the cost of launching satellites is expensive, the United States and the Soviet Union have both organically combined the surveillance systems of the air, space and ground, forming a three-in-one surveillance system. The development and use of automatic surveillance stations is an important facet of the present arms race. They have intensified the tense situation of the cold war.

This type of automatic surveillance station not only can obtain strategic intelligence, tactical intelligence, but even the private affairs, likes dislikes and the family situation of certain leaders and specialists. The information has all been obtained by foreign intelligence agencies, making the Monkey seem to have far less tricks!

Then, how can this type of automatic surveillance station

Be Detected?

The simplest way is to initiate the masses, strengthen patrol, analyze and uncover suspicious situations.

The crimes of placing surveillance devices committed by diplomats and tourists who put on a phony face of good character must be firmly exposed. Equipment of state agencies, especially the equipment used by the leaders, must be manufactured domestically to prevent infiltration of listening devices.

Besides the above methods, technical means must be used to monitor large area surveillance of important areas using the monitoring stations. Camouflaged objects of suspicious movements can be recognized by using instruments similar to mine detectors and the highly sensitive Wheatstone bridge.

In addition, by analyzing the situation of the satellites that pass through various locations, especially the electronic spy satellites like the "Big Bird" satellite of the United States and the "Universe" satellite of the Soviet Union, by monitoring the signals that they receive, and by fixing and searching operations using ground radios, the "infiltrated spies" of various places can be eliminated.

Even though the time of transmission of information by the automatic surveillance stations is short and monitoring is difficult, and they are skillfully camouflaged and are very difficult to detect, if they are carefully treated, they can be completely eradicated.

9296

CSO: 4008

NATIONAL DEVELOPMENTS

BRIEFS

SHANGHAI SCIENCE ASSOCIATION--To better lead work in various fields, the Shanghai Municipal Scientific and Technological Association has set up several committees--an academic committee, a science popularization committee, an international academic exchange committee and an organizational work committee. These committees have a total of 117 members, including scientists, professors and engineers as well as cadres in charge of administrative work in the scientific and technological field. Recently the committees held their first meetings to plan their work. [OW131431 Shanghai City Service in Mandarin 1130 GMT 9 Oct 80]

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APPLIED SCIENCES

'CAMAC' FUNCTION MODULE SOON TO BE MASS PRODUCED

Shanghai JIEFANG RIBAO in Chinese 18 Jul 80 p 2

[Article by Wang Mingguo [3769 2494 0948]: "'CAMAC' Function Module Developed"]

[Text] Twelve kinds of "CAMAC" functional components developed by the Shanghai Instruments Research Institute were recently subjected to joint technological evaluation by the concerned departments of the State Bureau of Instrumentation, the municipal science commission and the city instruments bureau. They will be mass produced soon. The successful development of these components has provided a new road in promoting the widespread application of computers in our nation. They have also opened up a new path of exchange of technology between our nation and foreign nations.

"CAMAC" functional components are a kind of standard equipment that helps the computer realize automatic surveying and control. With this standard equipment, various types and models of computers can versatily adapt to various fields of applications with different demands. This kind of standard equipment began in the 1970's, and its earliest application was in the realm of nuclear physics research. Because of its strong versatility, adaptability, and standardization, and its ability to be assembled, it was widely used in the control systems of industrial processes, medical research, monitoring and maintenance of human bodily functions, environmental protection, analytical instruments, automation of laboratories, data transmission etc. At present, over 20 nations in the world commonly utilize this type of standard equipment.

The Shanghai Instruments Research Institute began in 1978 to develop this type of standard equipment. After 2 years of efforts, 12 lines of this type of equipment have been developed. Whether in design or in manufacturing technology, whether in the selective use of the original components or the external appearance, they have all been developed according to strict requirements. After testing in high temperatures, highly damp conditions and such adverse environments, and after continuously functioning for 200 hours, they have functioned well. Parts of the components

were utilized by the Shenyang Automation Institute of the Chinese Academy of Sciences and the Shanghai Atomic Nucleus Institute and were proven to be reliable in quality.

At the evaluation meeting held from the 8th to the 12th of this month, representatives from the First Ministry of Machine Building, the Second Ministry of Machine Building, the Fourth Ministry of Machine Building, the Fifth Ministry of Machine Building, the Eighth Ministry of Machine Building, the Chinese Academy of Sciences, related higher educational institutions, and research units throughout the nation evaluated these products in various kinds of tests and concluded that they were up to international standard.

9296

CSO: 4008

APPLIED SCIENCES

CHINESE CHARACTER COMPUTER INPUT SYSTEM EXPLAINED

Tianjin TIANJIN RIBAO in Chinese 23 Jul 80 p 4

[Article: "Simple Chinese Character Input System for Computers Is Successfully Developed; This Is Very Significant in Popularizing the Application of Computer Technology in Various Fields in Our Nation"]

[Text] NEW CHINA NEWS AGENCY, Beijing, July 21—The Beijing Eastern Scientific Instruments Plant's technicians Zhang Linxiang [1728 3829 5046] and translator Ge Xuejun [5514 7185 1227] have successfully developed a kind of simple Chinese coding method and a Chinese character input keyboard, providing a better Chinese character input system for our nation's application of computers. With this system, people need only to remember the numerical code of the number of strokes and the numerical code of the Chinese Pinyin (romanized spelling) of each Chinese character stipulated by the coding method. The numerical codes are input into the computer by the keyboard. The computer will then be able to automatically search for scientific and technical information, automatically compose newspaper layout, automatically carry out machine translation between various languages and automation of communications projects.

Not long ago, representatives and scientific and technical personnel and specialists from the National Defense Science Commission, the Chinese Academy of Sciences, Committee for the Reform of the Chinese Written Language and the Beijing University discussed this Chinese character input system and evaluated it highly. They all believed the successful development of this system is very significant to the popularization of the application of computer technology in the various fields and departments in our nation.

Because Chinese characters are not alphabetical, the problem of input of Chinese characters into the computer must first be solved to utilize the computer to perform work with Chinese characters. This requires that each Chinese character must be translated into a different Arabic number, and a computer keyboard that corresponds to this kind of code must be developed. To translate Chinese characters into Arabic numbers, it is necessary to design a good method of coding. This method of coding

Chinese characters and the keyboard constitute the Chinese character input system. In the past, because there were many Chinese characters, the form of Chinese characters was complex, and there were also many homonyms, our nation had never developed a more ideal Chinese character input system.

Zhang Linxiang and Ge Xuejuan successfully developed the "simple Chinese character coding method" using a method combining the sound and the form of Chinese characters to form a coding method. Compared to the phonetic method and the method of input of parts of characters by Chinese character codes being studied domestically and in foreign nations, this method is simple, easy to learn, easy to grasp, highly efficient in application, has few characters with the same codes, and is convenient to learn and use. People with only a middle school education can relatively skillfully grasp and use this method with only two or three days of training. The Chinese character input keyboard successfully developed by them is portable. It has 128 keys and 256 character codes. It can input Chinese characters and English directly into various types of computers without the addition of any conversion equipment.

9296

CSO: 4008

BRIEFS

REMOTE SENSING MEASURES POLLUTION--Recently an experiment was conducted in Tianjin where aircraft remote sensing technology was used for the first time in China to monitor urban environmental conditions. This experiment was organized by the Tianjin Scientific Committee and the Environmental Protection Office, and was carried out by the Remote Sensing Application Institute of the Chinese Academy of Sciences. The aircraft remote sensing experiment involved the use of many advanced sensing devices to monitor the environment over different seasonal and diurnal conditions. During the experiment, 40 monitoring flights were flown, accumulating a total flight time of over 80 hours. More than 200 pictures were taken at altitudes ranging from 3,300 to 200 meters; the pictures cover most of the heavily polluted regions of 148 square km of the city and part of the Bo Hai Bay. They were high resolution photographs showing the detailed features of each region. By analyzing these photographs and correlating them with observations made on land and at sea, the scientists will be able to reveal the major pollution sources and the conditions of damage of Tianjin City and the Bo Hai region. This information will be used for pollution prevention in the future. This experiment will be repeated during the August to September period and during the month of December. [Text] [Shanghai WEN HUI BAO in Chinese 12 Jul 80 p 2] 3012

TITANIUM DIOXIDE PRODUCTION--Beijing, 7 Oct (XINHUA)--Chinese scientists have produced pigmentary titanium dioxide--an important substance in the paper, chemical, paint and other industries--by an advanced technology used in few other countries. The production of this stable and durable pigment base is done by the plasma-heating method evolved by the Institute of Chemical Metallurgy of the Chinese Academy of Sciences. The technique was developed in the 1960's. Its advantage is that it produces high-quality titanium dioxide and causes no pollution. Cooperation with a Tianjin chemical works, said a member of the institute, accelerated the experimentation of the technique at a pilot plant with an annual capacity of 300 tons. During the experiment, the institute helped the chemical works train technicians and workers, thus paving the way to mass production. There are large deposits of ilmenite, an oxide of iron and titanium from which titanium dioxide is made, in Sichuan Province, southwest China. [Text] [Beijing XINHUA in English 0737 GMT 7 Oct 80 OW]

SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

NEED TO ESTABLISH RESEARCH DEVELOPMENT CENTER REITERATED

[Beijing GUANGMING RIBAO in Chinese 1 Aug 80 p 4]

[Article by Zhou Jijong [0719 1376 0022] and Cheng Changye [7115 2490 8518]]

[Text] What is called Research and Development is a scientific research link which transforms the results of applications research into direct production capacity by passing through intermediate testing, extended testing and production testing.

In comparison with basic research and applied research, the gap between our country's research and development and that of industrially developed countries is even greater. For example, in 1977, of the applied scientific research achievements of the Chinese Academy of Sciences, only 14 percent attained extended status, only a small portion of the applied research achievements were converted into direct production capability, while many foreign countries frequently are able to promote new technology, new crafts and new products into production every 3 to 5 years. Some countries' ratio of basic research, applied research and research and development has reached 1:2:6.

The history of modern industrial development tells us that regardless of whether a nation is developed or developing, a key to the realization of industrialization is the strengthening of the industrial research and development capability to form the central pillar of digesting imported technology, and the accumulation of the nation's technological development and production capacity.

Although China has 1,000 or 2,000 scientific research agencies in the industrial sphere, the majority of the research units are weak in technological capability and their scientific research facilities are backward. Compared with their burden of solving the thousands of product and technological problems of several tens of thousands of manufacturing and mining enterprises, it is obvious that their strength is fragmented and that they have the will but not the strength. Inasmuch as the scientific research agencies of many production departments lack the direction and assistance of an authoritative scientific

research institute with respect to scientific research operations, organization, and management, achievements in scientific research have run their course on their own. In the agencies there also exist such deficiencies as "small and complete" and overlapping. To discuss only testing, a problem existing generally is the weakness of the intermediate testing link. In our country there are very few research institutions which have a significant intermediate testing base. Because the intermediate testing link is inadequate, the scientific-research-to-production cycle is dragged out, the characteristics of the research achievements are unstable, technology lacks excellence, and it is difficult to convert scientific research achievements into direct production capacity.

We consider that establishing research and development centers is a powerful measure to turn around this backward and passive situation. It is an urgent task in the development of our country's science and technology. The primary mission of such research and development centers would be: to establish a solid base for intermediate testing, extended testing, and production testing, forming a complete scientific-research-to-production system; controlling the direction, topics and dissemination and digestion of achievements of the research and development of production departments to introduce technology; to be responsible for intelligence and analysis of research and development internally and abroad as well as for investigation and research in industrial conditions and research topics; to be responsible for evaluating the intermediate test projects of scientific research units of the production departments, such as the results of the application of a research item, is there sufficient probability of [its use in] industrial production, what is the outlook, the advantages and disadvantages of introducing technology versus our own research, and so on; to establish a set of procedures and policies for levels of responsibility, levels of evaluation, levels of promotion, levels of awards, and so on with respect to achievements in scientific research; to stimulate and coordinate scientific research activity among production departments, and so on.

Research and development centers can be expanded and refined step by step on the basis of need and actual conditions, or as the state provides capital for establishment, or as assumed by a certain research institute among various types of production departments which first achieves the [appropriate] scale.

There are three questions here which are worth attention: when selecting foreign technology for introduction, the introduction of "suitable technology" should be considered adequately, that is our nation's resources, natural conditions, capital, employment of the population, the state of industrial development, and other similar elements should be considered, and "advanced world levels" should not be blindly pursued;

it should become the department's scientific research unit's pattern for carrying out scientific research contract policy, with the enterprise and the research institute signing a contract specifying explicit technological responsibilities and economic responsibilities; and the primary effort should be placed on the propagation of new technology which can take effect in the near term.

8174

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SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

FIRST NATIONAL METASCIENCE RESEARCH SOCIETY FOUNDED IN BEIJING

Beijing GUANGMING RILAO in Chinese 1 Aug 80 p 4

[Article by Jin Liangjun [6855 5328 3182], Xing Tianshou [6717 1131 1108] and Qiu Hongxun [6726 3414 8113]]

[Text] The Beijing Metascience and Research Society was founded recently. This is China's first metascience research society and is an academic organization for the mass development of scientific studies and scientific development management studies in the Beijing area.

In recent years, metascience research workers in the Beijing area, along with scientific research management workers, have actively studied, conducted research, and promoted scientific studies in an effort to probe the theory and methods of modern scientific management. Earnestly investigating the history and current state of metascience abroad, information workers in natural sciences, social sciences and technology actively proceeded with the research achievements of the scientific studies of all nations, endeavoring to translate research material in metascience, writing articles on metascience, and assembling our country's research in practical and developmental metascience. The Beijing Technological Economics and Management Modernization Research Society and the Beijing Natural Dialectical Method Research Society also jointly sponsored a metascience chair. Nearly 100 organizations have established metascience research groups at various times.

The mission of this research society is: To develop research in metascience and scientific research management, to disseminate knowledge of metascience to managers of science and technology and workers in scientific and technology, to furnish opinions in response to inquiries related to policy on science and technology as well as to the management of science and technology to scientific and technological departments, to translate and publish literature and information on metascience, and to develop academic exchanges in China and abroad on metascience and the management of scientific research.

At the meeting establishing the research society, the vice chairman of the National Defense Scientific and Technological Commission, the famous scientist Qian Xuesen [6929 1331 2773], delivered an academic report: "The Management of Science and Technology and Scientific Studies," which was welcomed by the over 1,000 persons at the meeting. The vice chairman of the Beijing Municipal Scientific Committee and vice chairman of the Municipal Science Association, Tian Fu [3944 1133], also spoke.

8174

CSO: 4008

PUBLICATIONS

TABLE OF CONTENTS OF 'DIWEN WULI' NO 2, 1980

Beijing DIWEN WULI [ACTA PHYSICA TEMPERATURAE HUMILIS SINICA] in Chinese
Vol 2 No 2, 1980 preceding p 81

- [Text] Electron States at Superconducting Normal Interfaces
.....YANG Zhanru [2799 1455 1172], Department of Physics,
Beijing Normal University; Gong Changde [7895 2490 1795] and
Cai Jianhua [5591 1696 5478], both of the Department of Physics,
Nanjing University (92)
- Superconductivity of Lanthanum.....Zhang Liyuan [4545 4539
3293], Yin Daole [1438 6670 2867] and Han Rushan [7281 3067
3790], all of the Department of Physics, Beijing University (97)
- Enhancement of the Upper Critical Field of Two-Band Super-
conductors.....Lei Xiaolin [7191 0876 7207], Shanghai
Institute of Metallurgy, Chinese Academy of Sciences (110)
- Experimental Investigation of the Determination of the
Characteristics of the Short Samples of High Current Super-
conductor with Inductive Methods.....Yi Changlian [2496
2490 4886], Kong Qingwen [1313 1987 2429] and Zhao Huijuan
[6392 1920 1227], et al, all of the Institute of Electrical
Engineering, Chinese Academy of Sciences (118)
- Analysis of Two-Dimensional Magnetic Field Homogeneity for
Superconducting Dipoles and Rational Selection of Geometrical
Parameters of the Windings.....Feng Zhixin [7458 0037 9515],
Institute of Electrical Engineering, Chinese Academy of Sciences (127)
- Estimation of Radial Temperature Non-Uniformity (Gradient)
Effects on Precision Cryogenic Thermometer Calibrations.....
Deng Daren [6772 1129 0117], Shanghai Institute of Process
Automation Instrumentation (134)
- Calculation of the Shuttle Heat Transfer in a Reciprocating
Refrigerator.....Yang Chunjiang [2799 2504 3068], Shanghai

Institute of Technical Physics, Chinese Academy of Sciences (141)

Development of a NbTi-CuNi-Cu Multifilamentary Superconducting Composite and Flat Cable.....Xie Huijiu [6200 1920 0036], Zhou Guixiang [0719 2710 7449], Guo Zhenjin [6753 4176 6855] and Chen Zhenguo [7115 6297 0948], all of Baoji Institute of Non-ferrous Metals Research (149)

An Experimental Study of Dynamical Process of Quenching of Superconducting Magnet.....Chen Zhuomin [7115 3504 3046], Han Hanmin [7281 3352 3046], Shi Airu [4258 5676 1172], et al, all of the Institute of Plasma Physics, Chinese Academy of Sciences (158)

The Study of New Melting Technology of NbTi50 Superconducting Alloy.....Zhou Nong [0719 6593], Li Chengren [2621 2052 0088], Wu Xiaozu [0702 2556 4436] and Xiong Shougao [3574 1108 7559], all of Baoji Non-ferrous Metals Institute (163)

Measurement of the J_c -H Curves of Three Kinds of NbTi Wire under Different Temperatures.....Cheng Benpei [4453 2609 1014], Wang Jinxing [3769 6855 2501], Tang Kairong [3282 0418 2837] and He Yigui [0149 6695 2710], all of the Southwest Institute, Second Ministry of Machine Building (170)

Observation on Two Kinds of Structures in the Vapor-Deposited Nb₃Sn Tape.....Wang Shouzheng [3769 1343 6086], Department of Physics, Beijing University (174)

9717

CS0: 4008

PUBLICATIONS

TABLES OF CONTENTS OF 'KEXUE HUABAO' NOS 2, 5 1980

Issue No 2

Shanghai KEXUE HUABAO [SCIENCE PICTORIAL] in Chinese No 2, Feb 80 p 47

[Text] Table of Contents

Twenty-three Years of Space Travel--

He Zhenghua [0149 2973 5478]..... (1)

Modernization

Psychology and Modernization--Tien Peiming [3944 1014 2494]..... (2)

New Rivals in Electronic War--Neutrino

Communication and Fluid Jet Communication--

Han Guoliang [7281 0948 5328]..... (4)

Wonder Metals--Yao Shoukan [1202 1343 1030]..... (6)

The Magic Eyeglasses--Li Fake [2621 4096 4430]

and Li Guangyuan [2621 0342 6678]..... (8)

Disney World--Entertainment and Science--

Gao Zhong Hua [7559 1813 5478]..... (10)

International Mathematics Olympic--

Gu Kejing [7357 0688 2417]..... (12)

Death of the King Bee--

Zou Xinyan [6760 2450 3508] and Liu Guoxiong [0491 0498 7160]..... (22)

The Potential Hazards--Worries and Joys of Genetic

Engineers--Geng Zhencheng [1649 6966 1004]..... (24)

Prodigy Children--Ju Sin [1446 6580]..... (26)

Brighter Than 1,000 Suns--Yin Xingguo [2019 5281 0498]..... (44)

Ideas and Innovations..... (28)

Automatic Fishing Plants. Automatic Electric
'Ladder.' New Revelations From the Pigeons.
Reaching Into Space Via Sky Ladders

Science Fiction: The Last Recording of Professor Dubu--
Zhu Hongren [2612 3163 0088]..... (41)

Building Your Own Tape Recorder--Jie Sen [2638 2773]..... (38)

Outpatient Doctor

What Tonics Should Be Taken in the Spring?..... (14)
Why Can the Hymen Also Rupture Before Marriage?..... (14)
Effectiveness Considerations in Health Improvements..... (14)
What Foods Should a Patient Stay Away From?..... (14)
The Natural Gastroscope..... (15)
Why Do Some Athletes Have Blood in the Urine?..... (15)
What To Do When Little Boy's Testicles Disappear..... (16)
What Medicines Should a Family Keep on Hand?..... (16)

Brief News in Science and Technology..... (18)

Beijing's New Three-Dimensional Highway Interchange
New Material To Shield Microwaves
New Sterilization Method in Women
Three Layer Plastic Board
High Efficiency, Low Toxicity Preservative
Electronic Electroscope
New Engraving Technique Using Electric Erosion
Low Temperature Air Conditioning for Rice Storage
Roundness Gage Using Microprocessor
New Development in Memory Alloy
Family Size Solar-Powered Hot Water Heater
Fabric Material Separates Oil From Water
Metal Alloys Store Hydrogen Gas
Rotating Chainsaw as Multipurpose Cutter
Low Pressure Air-Powered Screwdriver
Pocket-size Translation Machine
Flame Burner as Rust Remover
Frozen Vegetables Fresher Than Fresh Vegetables

Tidbits in Science

Thinking About Edison's 'Multiple Thought Method'..... (30)
Three Generations of Pirry Men..... (30)

'Mad Mathematicians' (Galova).....	(30)
The Powerful Colors.....	(32)
The Amazing Discovery of Nitrogen-Fixing Bacteria in Human Bodies.....	(32)
Six Principles of Education Modernization.....	(33)
Intelligence Exercises	
Elevator Design. Break the Spy's Communication Code.....	(40)
Little Experiments.....	(36)
The Rotating Aluminum Shell Artificial Volcano in a Dish Iron Rod Turned Into Copper Rod The Flammable Gel	
The Why's.....	(34)
Why Do Some People Eat Wick, Raw Rice and Dirt? Why Do Large Airplanes Dump Their Fuel in Emergencies? Why Don't Birds Fall From the Tree in Their Sleep?	
Front Cover:	Model JK-110 Industrial Control Computer System (Product introduction)
Inside Front Cover:	Twenty-three Years of Aerospace Flights
Inside Back Cover :	Modern Optical Equipment Produced by Xin Tian [2450 1131] Precision Optical Equipment Company
Back Cover:	Model JK-110 Industrial Control Computer System (Product introduction)

Issue No 5

Shanghai KEXUE HAUBAO [SCIENCE PICTORIAL] in Chinese No 5, May 80 p 48

[Text] Table of Contents

New Science Disciplines on the Rise

The Tragedy of Chrysler Corporation--Scientific Management.....	(1)
Self-education and Talent Investment--Personnel Science.....	(1)
Broadly-Based Talents Succeed--Scientific Education.....	(1)
Meeting of the Mad Scientists--Schools in Science.....	(1)
Three Generations of Aviation Industry--Scientific Economics.....	(2)
Artificial Satellites and Neutron Bombs--Scientific Forecasting..	(2)
The(Cohen) Fever--History of Science and Technology.....	(3)
Fish in the Thames--Law in Science.....	(3)
Policy Making and Counseling--Scientific Policy.....	(4)
Intangible Wealth--Information Science.....	(4)

Modernization

Three Steps in Machine Translation-- Wang Dechun [3769 1795 2504].....	(5)
Toys and Intelligence Development in Infants and Children--Liu Chenglan [0491 2110 5695].....	(30)
Information Explosion and the Human Brain Capacity--Sun Yiyan [1327 5030 7159].....	(24)
Famous Buildings of the World-- An Fang [1344 2397].....	(8)
Man-made Heaven [Space colony]-- Zhu Yilin [2612 3015 7792].....	(10)
Science in a Moving Display Window-- He Guanshan [0149 7070 0810].....	(12)

Major Astronomy Discoveries in the 1970's-- Wu Zhiren [0702 2535 0088].....	(22)
World's Famous Hurricane Zones-- Gao Xilan [7599 1585 5695].....	(26)
The Mystery of the Big Explosion in Tungus-- Cai Ruiliang [5591 3843 5328] and Huai Lu [2037 3406].....	(28)
$10^{39} = ?$ -- Su Rukeng [5685 3067 6972].....	(32)
Science Fiction: The Last Surgery of Master (Pharud)-- Du Shi [2975 1395].....	(44)
Troubleshooting the Friendship JD16 Television-- Huang Yin [7806 1305] and Han Renzhi [7281 0117 0037].....	(42)
Outpatient Doctor	
How To Choose a Blood Fat Reducing Medicine?.....	(14)
What Is the Broad Bean Disease?.....	(14)
Benefits Derived From Drinking Sour Milk.....	(15)
What To Do When One Sees Floating Black Shadows.....	(15)
What Exercises Are Good for the Elderly?.....	(16)
How To Choose a Birth Control Method.....	(16)
Brief News in Science and Technology.....	(18)
Electronic Abacus	
10-Meter Hydraulic Jack	
Electronic Telephone Receiver	
Simulation	
A New Method for Apple Storage--Silicon Window Air Conditioning	
New Ion Electrode for Animal Insemination Selection	
High Thermal Efficiency Small Burner	
Measurement Standard Device for Coaxial Thermal Noise	
Solar Powered Yacht	
Elevator Band Stand in Theater	
Miniature Thermal Printer	
360-Degree Spherical Mirror	
Super Absorbent	
Hat Cooled by Air Circulation	
Mechanical Hand That Can Feel	
Instantaneous Heart Pulse Monitor	
Cathode Ray Electronic Typesetter	
Air Bag Jack	
Bandaid That Cools the Wound	
Material That Expands Under Ultraviolet Light	
Foam Metal and Foam Alloy	

Tidbits in Science

Delaying the Aging Process of the Brain.....	(34)
From Broad to Specialized to Comprehensive Knowledge.....	(34)
Petroleum From Plants.....	(35)
Giraffe and the Pilot.....	(36)
'Reverses' in Discovery and Invention.....	(36)
Flu and the Birds.....	(36)
Eighteen Girls Suddenly Turned Into Boys.....	(37)
Monkeys' Intelligence.....	(37)

Intelligence Tests:

A Torn Up Poster. Seven Square Chess. Complaints of a Chicken Thief.....	(6)
---	------

The Why's..... (38)

Why Is It Necessary To Know the Precise Time When Drawing Borders Between Countries? Why Does the Image Shrink When the Television Is Turned Off? Why Does Stainless Steel Also Rust?

The How's..... (40)

How To Make a Wall-Hanging Modular Bookshelf How To Record Programs Using Cassette Recorders What To Do When the Fluorescent Lamp Won't Start How To Make a Switch Using a Gas-Filled Spring Contact Tube
--

New Products

SYK Horse Brand Airplane Seats.....	(47)
Model F30 Portable Medical Diagnostic X-ray Machine.....	(48)

Front Cover: Shuang Ling [7175 1545] Brand MOS Integrated
Circuits (see p 32 text)

Inside Front Cover: New Science Disciplines on the Rise
Inside Back Cover: Medium to Low Pressure Air Compressor System

Back Cover: Shanghai Brand and Chulei [2504 5628] Brand
Watches

9698
CS0: 4008

PUBLICATIONS

TABLE OF CONTENTS OF 'JISHU BIAOZHUN TONGBAO' NO 3, 1980

Beijing JISHU BIAOZHUN TONGBAO [TECHNICAL STANDARDS BULLETIN] in
Chinese No 3 May 80 Inside front cover

[Text] Table of Contents

Calling for High Standards and Rigor in the Selection
of the 1980 National Quality Awards--
Wang Liang [3769 5328]..... (1)

On the Subjects for Standardization and the
Multiplicity of Standard Forms--
Gu Mengjie [7357 1322 3381]..... (2)

French Standardization Theory Specialist
J. C. Coutierre Visits China--Bulletin News..... (4)

Introducing National Standards

Key Linkage--Basis Room, Standardization Institute,
First Ministry for Machine Building..... (5)

Measurements of Young's Modulus in Metals--
Liu Yuhui [0491 5038 6540]..... (7)

Foreign Standardization Institutions

European Coordination Committee on Standards (CEN)--
Su Xitien [5685 6932 3944]..... (13)

European Coordination Committee on Electrical Standards (CENEL).... (13)

International Committee on Quality Evaluation
Procedures for Electrical Equipment (CEE)..... (14)

Foreign News Briefs

ISO Technical Committee and Subcommittee

Meetings Announced--Zhao Lanjie [6392 5695 2638]..... (12)

ISO Standardization Educational Workshop..... (15)

International Meeting on Agricultural Standardization..... (15)

"International Lubricant Classification System"

Close to Completion..... (15)

Recently Issued National Standards..... (16)

Recently Issued Ministry Level Standards..... (18)

New Publications on Standardization

Circular Material "Tolerance and Fitting"

Scheduled for Publication--Bulletin..... (Inside back cover)

Introducing Translated Materials on Rotary

Electrical Machinery--Fu Fengli [0265 6265 4409],

Shanghai Institute of Electrical Components..... (Inside back cover)

Symposium on Rice Cross-Breeding Technology

Held in Yichun--Standards Section, Yichun

Prefecture Measurement Bureau..... (Back cover)

Nanjing Standardization Society Held Annual

Meeting--Zhu Xingyi [2612 5281 5030], Nanjing

Standards and Measurements Bureau..... (Back cover)

Erratum in Metallurgical Standards..... (17)

9698

CSO: 4008

PUBLICATIONS

TABLE OF CONTENTS OF 'KEXUE HUABAO', AUG 80

Shanghai KEXUE HUABAO [SCIENCE PICTORIAL] in Chinese No 8, Aug 80 p 48

[Text] Implicit Science and Explicit Science (I)..... Zhao Yu [0340 3768] (1)

Modernization

President Carter's "Secretary".....Guang Yu [1639 5124] (2)

The World's Utmost Super Computer.....Gu Kejing [7357 0668 2417] (4)

Highbise Gardens--Start a Garden in Apartments.....Shen Jiren [3088 4949 0088] (6)

Sculpture Copy and Model Building.....Yun Tian [0061 1131] (8)

Air Taxi.....Jian Ning [0494 1337] (10)

New Breakthrough in Large Scale Solar Energy Application--Generating Electricity in a Salt Water Bath.....Kong Baoding [1313 1405 1353] (12)

What Type Are You?-- About Human Nature.....Tien Peiming [3944 1014 2494] (22)

Highest International Award in Mathematics--The Fields Award and the International Congress of Mathematicians.....Xiao Wen [5135 2494] (24)

Could This Be 4000-Year-Old Brilliant Civilization? Translated and edited by Zhou Qiulin [0719 4428 7792] and Fu Tianbao [0265 1131 0202] (26)

Female Corpse in the Bathtub.....Dong Zhongling [5516 0112 7881] (28)

Do Animals Have Thoughts?.....Xu Yongqing [1776 3057 1987]	(30)
Twelve Famous Places in the World:	(32)
Yellowstone Park. Lalibela Rock Church. Ile de Goree. Galapagos Island. Nahanni National Park.	
At the Edge of a Black Hole (Science Fiction).....Translated by Wang Jiwu [3769 6549 2745]	(42)
Pipe Organ Made Electronic (II).....Lu Minfeng [6424 3046 1496]	(46)
Outpatient Doctor	
Do You Wish To Have a Healthy Child?	(14)
Medicines for Angina Pectoris Patient	(14)
Chinese Medicine Taken Cold and Hot	(15)
What To Do if you Have Varicocele?	(16)
Synthetic Thymol and Synthetic Bezoar	(16)
Children With Fever Should Drink Water with Sugar and Salt	(16)
Causes for Late Teething in Infants	(17)
Mouth Symptoms for Lack of Vitamin C	(17)
Brief News in Science and Technology	(18)
New Suppressant for Chronic Fume	
Surgical Machine for Eyeball Vitreous Body	
New Technique in Underwater Arc Cutting	
Foldable Polyethylene Soft Box	
Thermal Shock Test Bed for Diesel Engines	
Methane Gas Produced by Sewage and Slush in Leather Making	

Water Quality Stabilizer With Many Functions	
New Resistive Muffler	
Information Transmission Device for the 1980's	
Absorbing Block Reduces Machine Noise	
Hot Scissors	
New Plastic PPS	
Portable Solar Powered Water Pump	
A Simple Thin Film Water Cleaner	
Rotational Electromagnetic Puller	
Automobile Body as Cathode for Rust Inhibition	
Thin Film Prevents Glass From Shattering	
Quick Freeze Aerosol	
Mosquito and Insect Trap	
Waterproof and Thermal Insulating Paint	
Microcomputer Heart Pulse Monitor	
Titbits in Science	
Different Opinions, Einstein Versus Edison	(34)
Experiment To Begin in the Year 2000	(34)
Life Prolonging New Serum Lipid	(35)
Asimov's Worry and the Brain Revolution	(35)
Magnetic Stone Babies in Columbia	(36)
Research Topics for Amateur Scientists: Ball Lightning and Time Table Genetics	(36)

The Why's:

(38)

Why Do the Figures in Ancient Wall Paintings Have Dark Faces?

Why Do the Color TV Sets Bought Overseas Not Always Show Colored Images in China?

Why a Hand Pump With a Gas Container Is Lighter to Operate?

The How's:

(40)

How to Care and Use Records?

How to Make a Wall-Hanging Movable Clothes Hanger?

How to Use Saccharing Sensibly?

How to Touch-Up Photographs Without Leaving Traces?

Intelligence Exercises: The Smart 'Blind' Kid. Three Newlywed Couples. Who Is Telling the Truth?

Front cover-- Model DJS-210 digital electronic computer

Inside front cover-- Implicit science and explicit science

Inside back cover-- Oilless gas compressor system

Back cover-- Model DJS-112 and DJS-110 digital electronic computers

9698

CSO: 4008

AUTHOR: LI Xueguo [2621 1331 0948]

ORG: None

TITLE: "Black Box--the Witness of Airplane Accident"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 5, May 80 pp 6-8

ABSTRACT: The so-called "black box" is a flight recording instrument on an airplane designed to record various technical data during a flight. These data can be used to provide post-mortem analysis of the sequence of events that occurred in case of an airplane accident. In this article, the basic operating principle of a black box is explained. The design criteria for ensuring the survival of a black box during a crash are discussed. The historical development of the black box and the evolution of its recording instruments over the years are reviewed. In conclusion, the application of modern electronic and computer technologies in the design of new recording systems for the black box is also discussed.

AUTHOR: ZHANG Zhifang [1728 1807 2455]

ORG: None

TITLE: "A New Aircraft Material --Heat Resistant Titanium Alloy"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 5, May 80 pp 12-13

ABSTRACT: Heat resistant titanium alloy is a new material which has two important properties: 1) high mechanical strength at elevated temperatures; and 2) good thermal stability (i.e., good plastic characteristics) under varying temperature conditions. After 20 years of research and development, technologies now exist to produce titanium alloys which can withstand temperatures from 500°C to 650°C. Most heat resistant titanium alloys are used on compressor blades of an aircraft engine. They are also being considered for other applications such as surface skin of supersonic airplanes and engine housing.

AUTHOR: SE Ji [1835 0370]
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ORG: None

TITLE: "Passive Interference"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in
Chinese No 5, May 80 pp 16-17

ABSTRACT: Passive electronic interference is an important offensive as well as defensive measure in modern warfare. The commonly used passive interference devices include metallic chaff, angular reflectors, decoys, microwave absorption materials, and ionized suspended particles. Basically, passive interference is used in the following military operations: 1) protecting aircraft in penetrating enemy defense; 2) protecting warships and covering fleet activities; and 3) assisting the penetration of warheads of intercontinental ballistic missiles during re-entry.

AUTHOR: WANG Chih [3769 4460]

ORG: None

TITLE: "Space Photography"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in
Chinese No 5, May 80 pp 18-20

ABSTRACT: Space photography has a wide range of applications: 1) military reconnaissance; 2) monitoring earth resources, weather conditions, and environmental pollution; 3) interplanetary exploration; 4) collecting engineering information on spacecraft performance; and 5) constructing lunar map. The types of imaging devices used in space photography include: panoramic-view cameras, mapping cameras, short film television cameras, three-dimensional cameras, and special purpose devices such as multi-spectrum and infrared cameras, and X-ray telescopes, etc. Because of its special mission, a space imaging device must be designed to operate under conditions of severe mechanical stress, high vacuum, severe temperature variations, and intense radiation. To achieve good pictures, astronauts must receive thorough training in photography and in the operation of space photographic equipment.

AUTHOR: KUNG Panping [1313 0416 1627]

ORG: None

TITLE: "Space Observation Platform"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 5, May 80 pp 24-26

ABSTRACT: In July 1972, the United States launched the first Earth Resource Technology Satellite (ERTS-1) into orbit to monitor and photograph various activities on earth for the purpose of agricultural and forestry development, geological survey, water resource development, and water pollution control. At the present time, a second generation earth resource satellite system (ERTS-D) is being planned which will have superior sensor system with "theme detection and mapping instrument", relay satellite to provide real-time data processing, and the use of global positioning system to improve measurement accuracy of image regions. The Goddard Flight Center and the General Electric Co. are also developing concepts for future space observation platforms; they include: 1) an earth monitoring satellite network; 2) earth synchronous synthetic aperture radar; 3) advanced ERTS system; 4) thermal inertia measuring system; 5) radar holographic imaging device; 6) satellite with microwave capabilities; and 7) elliptic sensing device with a dual transmit-receive radar system.

3012
CSO: 4009/218

Chemical Engineering

AUTHOR: YU Guocong [0151 0948 3827]
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TITLE: "The Steady Characteristics of Packed Column for Close-Boiling Fractionation"

SOURCE: Beijing HUAGONG XUEBAO [JOURNAL OF CHEMICAL INDUSTRY AND ENGINEERING]
in Chinese No 2, Jun 80 pp 109-116

TEXT OF ENGLISH ABSTRACT: The first part of this paper is concerning the optimum reflux ratio of a packed column for close-boiling fractionation. A correlation is proposed to find the NTU at finite reflux and from which a graph representing the optimum reflux ratio is derived. It is found that the maximum value of the optimum reflux ratio is about 1.4 R_m .

The second part of this paper is concerning the optimum ratio of column diameter to packing size. Experimental work has been conducted with four laboratory columns of 20, 28, 32 and 44 mm in diameter respectively, the height of the

[Continuation of HUAGONG XUEBAO No 2, Jun 80 pp 109-116]

packed bed ranging from 1020 to 1475 mm, the packing used being 2.5 x 2.5 mm angular helices and the testing system to be n-heptane-methylcyclohexane. The true separation efficiency (i.e., true HTU or true NTU per meter of bed height) is evaluated from the experimental composition profile by discarding the end effect at the top and bottom ends of the packing. By plotting the true separation efficiency versus the ratio of the column diameter to packing size, all the curves at constant vapor velocity exhibit an optimum reflux ratio with nearly identical values. The optimum reflux ratio for this packing is found to be 13-14, which is in rough agreement with that for the ordinary or industrial size of packing.

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ZHANG Li [1728 4409]
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TITLE: "A Study of the Pagoda Type Vertical Internal Baffle in Gas-Fluidized Bed"

SOURCE: Beijing HUAGONG XUEBAO [JOURNAL OF CHEMICAL INDUSTRY AND ENGINEERING]
in Chinese No 2, Jun 80 pp 117-128

TEXT OF ENGLISH ABSTRACT: A new type of internal baffle has been developed for the purpose of improving the performance of gas-fluidized beds. The fluidizing behavior of the new pagoda type baffles has been studied in a two-dimensional bed in comparison with those of other types, and both photographs and moving pictures have been taken to demonstrate their viability in breaking up bubbles and enhancing gas-solid contact.

The pagoda baffles installed in a 30-cm diameter pilot plant fluid-bed reactor for manufacturing phthalic anhydride from catalytic oxidation of naphthalene

[Continuation of HUAGONG XUEBAO No 2, Jun 80 pp 117-128]

have been found to increase the feed load from 50-100 to 100-160 grams per hour per kilogram of catalyst as compared to horizontal baffles originally used in the same reactor, corresponding to an increase in duty of 50 to 100 percent.

The experimental data has been treated with a two-phase model. Results show that a fluidized reactor with pagoda internal baffles has a very high interchange coefficient between the bubble phase and emulsion phase.

AUTHOR: FAN Zheng [5400 2973]
HUANG Anji [7806 1344 0679]
CHEN Jiayong [7115 1367 6978]

ORG: All of the Institute of Chemical Metallurgy, Chinese Academy of Sciences

TITLE: "Studies on Gas-Lift Gas-Liquid-Solid Three-Phase Reactor"

SOURCE: Beijing HUAGONG XUEBAO [JOURNAL OF CHEMICAL INDUSTRY AND ENGINEERING]
in Chinese No 2, Jun 80 pp 129-142

TEXT OF ENGLISH ABSTRACT: Studies were made on certain characteristics of a gas-lift reactor. This type of reactor is called a Pachuca tank in hydrometallurgy and is used widely as a gas-liquid-suspended solid particles three-phase reactor. Methods were developed to calculate gas-liquid and gas-liquid-solid particles circulation capacity through the central tube of the reactor based on the energy balance principle. Starting from the force balance on a solid particle, equations with dimensionless groups were also developed to calculate the critical settling velocity of particles at the reactor bottom. Based on experimental results, the critical plug-up velocity of the reactor can be calculated by an equation developed. Results can be used for the design and operation of this kind of reactor.

AUTHOR: YU Zunhong [0060 6690 1347]
SHEN Caida [3088 2088 1129]
PAN Huiqin [3382 1920 3830]
CAI Guoqiong [5591 0948 1730]
SUN Xingyuan [1327 2622 0337]

ORG: All of the Department of Chemical Engineering, Shanghai Institute of Chemical Technology

TITLE: "Mathematical Model of Zone Method in Calculating Radiating Heat Transfer and Its Application in Box or Cylindrical Furnace"

SOURCE: Beijing HUAGONG XUEBAO [JOURNAL OF CHEMICAL INDUSTRY AND ENGINEERING]
in Chinese No 2, Jun 80 pp 143-164

TEXT OF ENGLISH ABSTRACT: A mathematical model using the zone method to calculate radiating heat transfer is described. In the zone method, the system is divided into surface zones and gas zones, the number of which depends on the accuracy of results desired and calculation time required. The temperature profiles in a furnace are obtained by solving simultaneously energy balances in each zone. As originally developed by Hottel and Cohen, the direct exchange areas are limited to cubes and squares. In this paper, the derivation of the direct exchange area equations is extended between any two zones in the box or

[Continuation of HUAGONG XUEBAO No 2, Jun 80 pp 143-164]

cylindrical furnace. These equations are adaptable to any dimension of rectangles, coaxial cylinder walls, end rings and other shapes.

A design method for the primary reformer of hydrogen production units and cylindrical furnaces is proposed. By considering the reaction kinetics, convective heat transfer and pressure drop inside the tubes, the zone method has been adopted to predict temperature profiles of process gas, furnace gas, tube surface and refractory surface in such furnaces. Results of calculation agree well with data obtained from commercial units.

AUTHOR: ZHENG Chi [6774 3589]
YING Xugen [5391 1776 2704]

ORG: ZHENG of the Shanghai Design Institute of Chemical Industry; YING of the Shanghai Institute of Chemical Technology

TITLE: "Calculation of Vapor-Liquid Equilibrium Data from Excess Thermodynamic Properties"

SOURCE: Beijing HUAGONG XUEBAO [JOURNAL OF CHEMICAL INDUSTRY AND ENGINEERING] in Chinese No 2, Jun 80 pp 165-172

TEXT OF ENGLISH ABSTRACT: Starting from non-isothermal excess enthalpy data (two or more than two sets) and isothermal vapor pressure data (one set), and based on the principle of corresponding states of solutions, a complete computation procedure of vapor-liquid equilibrium data is proposed:

- (1) calculation of excess enthalpy H^E , based on the principle of corresponding states of solutions;
- (2) calculation of Gibbs free energy G^E or its Q function;
- (3) calculation of bubbling point;
- (4) calculation of vapor-liquid equilibrium data.

The computation results for benzene-cyclohexane, benzene-n-hexane, benzene-n-

[Continuation of HUAGONG XUEBAO No 2, Jun 80 pp 165-172]

heptane, benzene-n-octane, carbon tetrachloride-benzene, carbon tetrachloride-cyclohexane and carbon tetrachloride-n-heptane, compared with the corresponding vapor-liquid equilibrium experimental data are quite satisfactory. The proposed computation procedure is appropriate to non-polar and slightly polar binary systems under relatively low pressures.

AUTHOR: GUO Tianmin [6753 1131 3046]
ZHONG Yinzhu [6945 6892 2612]
LI Zaicong [2621 0375 3827]

ORG: GUO of Huadong Institute of Petroleum Technology; ZHONG of the Computing Technique Research Institute of Shanghai; LI of Gaoqiao Chemical Plant of Shanghai

TITLE: "The Application and Comparison of Four Activity Coefficient Models in Vapor-Liquid Equilibrium and Distillation Calculations"

SOURCE: Beijing HUAGONG XUEBAO [JOURNAL OF CHEMICAL INDUSTRY AND ENGINEERING] in Chinese No 2, Jun 80 pp 173-190

TEXT OF ENGLISH ABSTRACT: The four well-known activity coefficient models (Wilson, NRTL, McCann and UNIFAC), coupled with the virial equation and tri-diagonal matrix method, have been successfully applied to the vigorous computation of various non-ideal distillation processes. The NIDISTL program developed by the authors has been tested on 33 distillation systems, with more than 100 calculations performed.

To make a parallel comparison of these activity coefficient models, 18 sets of binary vapor-liquid equilibrium data were chosen, and each set was fitted to the

[Continuation of HUAGONG XUEBAO No 2, Jun 80 pp 173-190]

Wilson, NRTL and McCann equations respectively by using the non-linear least square technique. The binary parameters so determined were used to predict the bubble point equilibrium data of 18 binary and 8 derived multicomponent systems. The predictions of four models were compared with experimental data.

To illustrate the consistency of distillation calculation results using different activity coefficient models, four examples are presented. The temperature, flow rate and composition profiles calculated are compared and the cause of discrepancy in some cases is discussed.

AUTHOR: XU Zhong [1776 1813]

ORG: Department of Power Engineering, Xi'an Jiaotong University

TITLE: "Pseudocritical Constants for Nonpolar Mixtures"

SOURCE: Beijing HUAGONG XUEBAO [JOURNAL OF CHEMICAL INDUSTRY AND ENGINEERING] in Chinese No 2, Jun 80 pp 191-200

TEXT OF ENGLISH ABSTRACT: With the aid of fundamental correlations of statistical mechanics and some assumptions, a simple method for calculating pseudocritical constants of mixtures containing nonpolar and slightly polar components is proposed in this paper. A detailed comparison of pseudocritical constants by this method with those by Lee-Kesler's rule has been made. Finally, using this method together with Lee-Kesler tables, compressibility factors for some gas mixtures have been calculated, obtaining good agreement with experimental data.

9717

CSO: 4009

AUTHOR: GUO Zuyuan [6665 4371 3293]

ORG: None

TITLE: "Opinions Concerning Regionalizing and Comprehensive Treatment and Control Plan of Urban Liquid Waste"

SOURCE: Beijing HUANJING BAOHU [ENVIRONMENTAL PROTECTION] in Chinese No 1, 80 pp 1-3

ABSTRACT: In order to reconstruct the old cities into modernized socialist clean cities, pollution of urban liquid waste must be eliminated. Pollution control and environmental protection must be combined with production development. The author suggests: (1) Economic losses from environmental pollution and waste of resources created by the liquid waste of each region must be surveyed and clarified. (2) The cost of investment and the economic benefits for controlling the source of liquid waste in the upper reaches of each district of the liquid waste system, constructing the coordinated engineering projects in the lower reaches of waterways must be clearly calculated. (3) Technical and economical comparisons must be made for selecting the plant site and treatment measures for treating urban liquid waste of each district. (4) The economic benefits and the optimal formula for urban liquid waste treatment and comprehensive utilization of each district must be derived. It is the opinion of the author that construction can proceed when the dual objectives of production increase and pollution control can be reached simultaneously.

AUTHOR: None

ORG: None

TITLE: "China Society of Environmental Science Determined Its Work for 1980"

SOURCE: Beijing HUANJING BAOHU [ENVIRONMENTAL PROTECTION] in Chinese No 1, 80 p 3

ABSTRACT: On 22-23 Dec 80, the second meeting of the Standing Committee of China Society of Environmental Science was held in Beijing. Since the establishment of the society in previous March, a great deal of work of organization and international scientific exchange had been accomplished. The committee resolved that in 1980, 3 branches of environmental engineering, environmental management, and protection of nature should be established. The 22 members of the committee also resolved that in 1980: (1) there should be a first stage of all out propaganda of methods of environmental protection; (2) there should be studies on such strategic subjects as environmental planning, energy source structuring, utilization of resources, bionomic balance, etc. (3) Emphasized development of studies on environmental economics, environmental law, and other subjects relating to environmental management; (4) the work of organizing and constructing the society must be continued.

AUTHOR: ZHU Haigang [2612 1920 0474]
CHEN Bingheng [7115 4426 5899]
YANG Youming [2799 1635 2494]
DAI Xiudao [2071 0208 6670]

ORG: None

TITLE: "Environmental Pollution and Genetics"

SOURCE: Beijing HUANJING BAOHU [ENVIRONMENTAL PROTECTION] in Chinese No 1, 80
pp 13-15

ABSTRACT: Since the liberation, a great deal has been accomplished with regard to health protection of women and children, many diseases of the newborn and children have been eliminated, and the infant mortality rate is reduced from the 26.11 percent of 1952 to 8.01 percent of 1978, surpassing the level of advanced countries. Yet, incidence of congenital heart disease and congenital deformity has risen from 8.4/10,000 and 5.6/10,000 of 1952 to 15/10,000 of 1978 for both conditions. With the development of medicine in China and effective control of many infectious diseases, death due to congenital deformity has become more noticeable and a majority of these cases are related to chromosome aberration or abnormal genes, while these abnormalities are closely related to environmental factors. The paper proceeds to explain the actions of environmental pollutants on heredity. This paper is to be continued.

AUTHOR: WANG Jinghua [3769 2529 5478]

ORG: None

TITLE: "Action of River Sediments in Pollution"

SOURCE: Beijing HUANJING BAOHU [ENVIRONMENTAL PROTECTION] in Chinese No 1, 80
pp 18-20

ABSTRACT: At present, when pollution condition of streams is being studied, the technique of direct determination of contents of pollutants in the water is mostly adopted, while a study of the sediments of the river is often neglected. This paper explains that sediments include permanent sediments and momentary sediments. The 2 types are of different characteristics and scale, but they are both created under the same dynamic condition. The current contents of pollutants in the sediments basically reflect the current condition of pollution of the river. Sediments in the river bed are divided into layers; therefore, a study of the contents of sediments of different layers may also reveal the history of pollution of a particular stream. A study of sediments may also resolve such problems as the action of sediments in adhering, absorbing, and decomposing the pollutants. These are very profound problems and should be included in the overall evaluation of pollution of a stream.

AUTHOR: XIANG Beiqin [0686 4102 3830]

ORG: None

TITLE: "Smog of Electricity"

SOURCE: Beijing HUANJING BAOHU [ENVIRONMENTAL PROTECTION] in Chinese No 1, 80 pp 23-25

ABSTRACT: With the birth of electronic industry, a revolution in industrial production has occurred, yet the electromagnetic energy produced by the electronic marvels can also damage the environment. The high frequency, microwave instruments used in industrial production, medical therapy, and scientific research, the broadcasting machines and antennas, the television transmission towers, the interconnection among electronic computers, the electric wave sent out by the communications satellites, and the microwave ovens in homes are constantly emitting electromagnetic waves of different frequencies and energy levels. Electromagnetic waves can interfere with television and radio reception, affect the control of artificial satellites, and cause automatic control devices and high speed electrical motors to make mistakes, and may also attack men and animals. This paper explains the nature of electromagnetic waves, their effects on environmental pollution, and possible measures for preventing the effects of electromagnetic waves on the environment.

AUTHOR: CHEN Fucheng [7115 1788 2052]
LI Zhiqiong [2621 1807 8825]

ORG: None

TITLE: "Organic Complex Fertilizer--Ammonium Humic Phosphate Made From Brewer's Liquid Waste"

SOURCE: Beijing HUANJING BAOHU [ENVIRONMENTAL PROTECTION] in Chinese No 1, 80 pp 36-38

ABSTRACT: The yellow liquid waste of the process of making Chinese white wine and the clear liquid precipitated from the waste of the process of making brewer's yeast contain humic acid, reduced sugar, phosphorus, nitrogen, potassium, nucleic acid, etc. and can be used as the raw material to make an organic fertilizer, very effective for improving various types of thin soils. This paper gives the chemical analyses of both types of liquid wastes and the process of using them to manufacture ammonium humic phosphate.

AUTHOR: SHEN Yingpeng [3088 5391 7720]
LAN Shucheng [5695 3219 3397]

ORG: None

TITLE: "Medium Sized Experimental Instrument for Deep Treatment of Liquid Waste of Oil Refining Process Has Been Certified"

SOURCE: Beijing HUANJING BAOHU [ENVIRONMENTAL PROTECTION] in Chinese No 1, 80 p 29

ABSTRACT: The cooperative research by the Dongfang Oil Refinery of Yanshan Petrochemical Company, Qinghua University, Beijing Municipal Institute of Environmental Protection Research, and Wushun Institute of Oil Refining Research of the Ministry of Petroleum has succeeded in producing a medium sized instrument for deep treatment of the liquid waste of the oil refining process. A technical certification conference was called in Dec 79 in Beijing. The instrument includes 2 parallel systems: an activated charcoal absorption system and an ozone oxidizing system. Both systems are briefly described. The conference resolved that supplemental experiment is needed because of the change of the quality of the water, but the ozone generation system, and the structure and work process of the ozone system are ready for application and extension.

AUTHOR: None

ORG: Beijing Dongfanghong Oil Refinery

TITLE: "Water Conservation and Pollution Reduction"

SOURCE: Beijing HUANJING BAOHU [ENVIRONMENTAL PROTECTION] in Chinese No 1, 80 pp 39-40

ABSTRACT: While developing production, improving the quality of the products, and increasing the number of products, Beijing Dongfanghong Oil Refinery strengthened industrial management at the same time to improve year after year the energy consumption and environmental protection problems of the refining process. Every year, the procedure of cyclic use of water has been expanded and the measure of reuse purified waste water perfected. After years of efforts, the rate of pollutant discharge has dropped and the quality of the waste water discharged has been made better. This paper describes the methods adopted by the refinery to save the quantity of water it uses and to reduce the wastes it discharges.

6248

CSO: 4009

Hydraulic Engineering

AUTHOR: XU Xieqing [6079 0588 1987]

ORG: Water Conservancy and Hydroelectric Power Research Institute

TITLE: "A Method for the Solution of Free Surface Gravity Flow by Finite Elements"

SOURCE: Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese No 1, Feb 80 pp 1-13

TEXT OF ENGLISH ABSTRACT: Among the difficult problems in hydraulics is the flow with a free surface because, not known a priori, it has to be determined as a part of the solution. A finite element method based on the variational principle for variable domains is proposed for this type of problem. As shown in the figure, the domain of solution is divided by a prescribed Γ curve into two sub-domains, the fixed ABEPQGMNOA and the variable EFQPE with the free stream line as its boundary. Triangular elements and linear distribution of ψ are adopted for the inner region, while trapezoidal elements and linear distribution of q^2 are adopted for the variable domain. The unknowns to be solved for are the values of ψ of the nodes and the ordinates of points on the free surface. Equating the partial derivatives of the functional to zero

[Continuation of SHUILI XUEBAO No 1, Feb 80 pp 1-13]

furnishes enough equations, thus the location of the free surface and the values of ψ are solved for simultaneously. The method is applied to free surface sluice gate flow over spillways and the computed pressure distribution agrees satisfactorily with experimental results.

AUTHOR: WANG Wenshao [3769 2429 7300]

ORG: Water Conservancy and Hydroelectric Power Research Institute

TITLE: "Strength, Liquefaction and Failure of Saturated Sands During Cyclic Loading"

SOURCE: Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese No 1, Feb 80 pp 14-27

TEXT OF ENGLISH ABSTRACT: The problem of strength, liquefaction and failure of saturated sands has always been of great concern in dealing with the safety of foundations of hydraulic structures and earth or earth-rock dams against earthquake action. This paper gives some criteria and methods for their evaluation. The theory of limit equilibrium has been used as a criterion to evaluate the incipient failure condition of the saturated sands under cyclic loading and corresponding laboratory tests and analytical methods are suggested. The distinction between liquefaction and incipient failure has been clarified. In addition, a preliminary scheme of open-type effective stress dynamic analysis method is proposed. Finally, subjects for further investigation are mentioned and the importance of preventive measures to avoid liquefaction and failure of saturated sands is emphasized.

AUTHOR: None

ORG: Laboratory of Photoelasticity, Hydraulic Engineering Department, Qinghua University

TITLE: "The Research and Practice of Abdomen Arch Dam"

SOURCE: Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese No 1, Feb 80 pp 28-44

TEXT OF ENGLISH ABSTRACT: A brief introduction to several kinds of Abdomen Arch Dams, a new type of concrete dam, is presented in this paper. Abdomen Arch Dams have been suggested and studied (both for the stress distribution of the dam and its construction method) in China since 1958. However, most of them were constructed after 1970. Through the measurements of such types of dams in the field, the arch action predicted by the models in the cross section as well as in the plan (Arch-shaped Abdomen Arch Dam) during operation was confirmed. Special construction methods pertaining to this type of dam have been developed in practice and a description of these is also given in this paper.

AUTHOR: PAN Jiazheng [3382 1367 6927]

ORG: Bureau of Hydroelectric Development, Ministry of Electric Power

TITLE: "Applications of Fracture Mechanics to the Design of Hydraulic Structures"

SOURCE: Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese No 1, Feb 80 pp 45-59

TEXT OF ENGLISH ABSTRACT: Cracks in the massive concrete of hydraulic structures are most harmful because of the mechanical and physical action of the percolating water. Since it is rather difficult to estimate whether the cracks are stable or not by conventional design methods, most hydrostructures are often designed under conservative considerations. The theory of fracture mechanics is now widely used in aeronautical and mechanical engineering with good results, but it is seldom used in hydraulic structures. In this paper, some possible applications of fracture mechanics in designing massive concrete works are described and shown with numerical examples, including: (1) the criteria for the stability of cracks or joints in massive concrete by the stress intensity factor, (2) the amount required and the effect of the reinforcement for closing the cracks, and (3) the determination of crack depth. However, for the further development of this theory in practical design work, more tests and research work are still needed.

9717

CSO: 4009

AUTHOR: LIU Jiacai [0491 0857 2624]

ORG: Water Conservancy and Hydroelectric Power Research Institute

TITLE: "Principle and Technology of Polyurethane Grouting"

SOURCE: Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese No 1, Feb 80 pp 71-75

ABSTRACT: Polyurethane is a new high molecular grouting material. Its experimental research began in China in the early 70's. Laboratory tests have now been completed as well as the period of intermediate field tests. Engineering application of this material will soon begin. The ingredients and the method of mixing this material and the technique of applying it as a grout to fill cracks of a width less than 0.1 mm are explained. Several difficult engineering problems resolved by using this grout material are described to illustrate the usefulness of the material.

AUTHOR: WANG Runfu [3769 3387 1381]
CHEN Hegun [7115 0735 5028]
LI Kedi [2621 0344 2420]

ORG: All of East China College of Water Conservancy

TITLE: "Initial Stress Method for Solving the Problems of Creep Stress"

SOURCE: Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese No 1, Feb 80 pp 76-82

ABSTRACT: Concrete is a material having the characteristic of creep which will cause a slack of stress to cause it to be only about 0.6 times of the elastic original. At present, 2 methods are available to analyze creep stress: the slack method and the initial strain method. The former is an approximation and the latter is theoretically strict, but complicated computation is involved with the latter. The authors have derived an initial stress method with simpler calculation equations than the initial strain method. Physical equations of the initial stress method are explained starting with an explanation of the 2 ways of mathematical expressions of the creep characteristic. The paper also includes a brief comparison of the initial stress method with the other 2 existing methods.

AUTHOR: QU Xingye [4234 5281 2814]

ORG: Water Conservancy and Hydroelectric Power Research Institute

TITLE: "Drainage Calculation for Tiles Under the Condition of Seepage From Canal and Ponded Water"

SOURCE: Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese No 1, Feb 80 pp 60-65

ABSTRACT: In sections where irrigation canals and pottery tubes are alternately placed, a certain width on the ground surface is retained on both sides of the canals and above the head of the drainage tubes to form a water-free zone. The existence of a water level differential provides the condition for the canal and the seepage of the rice paddy to converge toward the hidden tubes or tiles. The method of computing the volume of seepage of the paddy and the ground water table has theoretical as well as practical significance in providing a reference for a reasonable design of the irrigation and drainage engineering project of the paddy and its scientific management. Equations used for the calculation are analyzed. Sample calculations are given as well as model experiment data to verify the correctness of the theoretical equations.

AUTHOR: DU Guohan [2659 0948 5060]
PING Runze [1756 3387 3419]

ORG: Both of Water Conservancy and Hydroelectric Power Research Institute

TITLE: "Sedimentation at the Tidal Barrages and the Agitation Dredging"

SOURCE: Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese No 1, Feb 80 pp 65-70

ABSTRACT: In the coastal regions of China, a large number of tidal barrages have been constructed at the estuaries. These barrages have been very helpful in holding back the tide, draining flood water, and holding water for irrigation purpose. The problem of silting has occurred in all the estuaries with barrages, and the problem is the most serious in the sedimentary shores of Bohai and Huanghai zones. For example, 18 of the 20 barrages in Hebei Province and Tianjin City have been so seriously silted that the flow capacity in 1977 has been reduced to 1/6 to 1/4 of the original design of 1200 sec m³. Studies in 1974-75 by Water Conservancy and Hydroelectric Power Research Institute and Hebei Provincial Bureau of Conservancy indicate that if mechanical boat is used for agitation dredging during ebb tide, silting at the barrages may be prevented. The reason for silting is analyzed and the mechanism of the silting reduction action of agitation dredging is explained.

AUTHOR: CHEN Jiaqi [7115 1367 3823]

ORG: None

TITLE: "Do a Better Job of Engineering Planning in the Project of Transferring Southern Waters to the North"

SOURCE: Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese No 1, Feb 80 pp 82-85

ABSTRACT: In Apr 79, China Water Conservancy Society held a discussion meeting in Tianjin for gathering opinions from all concerned with respect to the technology of transferring southern waters to the north. Since the liberation, considerable amount of work has been carried out by many units and several hypothetical schemes of shifting water from the upper, middle, and lower reaches of the Yangzi to the Huanghe, Huaihe, and Haihe valleys have been proposed. In the past few years, as the demand for water for agricultural use grew intense in these valleys, more studies were done. For this type of gigantic engineering project, there is no concrete experience available here or abroad, it is; therefore, necessary to listen to diverse opinions. These opinions are briefly summed up in the paper into the following aspects: (1) Is the water transfer necessary? (2) Where is the water to be transferred from? (3) What is the best route for the water to travel? (4) What will be the expected changes after the water is transferred? (5) Is the water transfer program economically reasonable?

6168

CSO: 4009

Hydraulic Engineering

AUTHOR: QIAN Ning [6929 1380]

ORG: Qinghua University

TITLE: "A Comparison of the Bed Load Formulas"

SOURCE: Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese No 4, 1980 pp 1-11

TEXT OF ENGLISH ABSTRACT: There are six bed load formulas as proposed by Meyer-Peter, Einstein, Bagnold, Engelund, Yalin and Ackers-White respectively which are currently in use throughout the world. In this paper these formulas are transformed into relationships between same dimensionless parameters such that they can be compared directly. The results indicate that at low rates of transport, in spite of the fact that certain discrepancies existed between the various formulas, the differences are of minor importance from the practical viewpoint of fluvial processes. Different formulas deviate widely at high rates of transport, and the experimental data available do not allow one to draw a definite conclusion. When the flow intensity is high, the transport rate of bed load as given by Einstein's formula might be too small. Although Engelund's formula gives a fairly good result for all flow conditions, there

[Continuation of SHUILI XUEBAO No 4, 1980 pp 1-11]

is much ground for believing that the theoretical derivation of the formula fails to be consistent after $\theta > 0.5$. It appears at present that the approach as proposed by Bagnold opens up a new prospect to the research of bed load transport.

AUTHOR: WANG Shiyi [3769 1102 3015]
GAN Jiandeng [3927 7003 4098]
ZHOU Guanlun [0719 0385 0243]
WU Binghai [0702 3521 3189]
LIU Jianmin [0491 1696 3046]
DENG Boqiang [6772 0130 1730]

ORG: WANG, GAN, ZHOU and WU all of the First Office, Bureau of Waterways of the Changjiang River; LIU of the Tianjin Research Institute of Navigation Engineering; DENG of Chongqing College of Communications

TITLE: "Navigation Regulations for the Upper Changjiang"

SOURCE: Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese No 4, 1980 pp 12-25

EXCERPT FROM ENGLISH ABSTRACT: There exist three kinds of difficult reaches for navigation in the upper Changjiang River, namely, shoals, rapids and dangerous passages. The principles and practical measures adopted in the course of regulation of these are summarized and some formulas and empirical data recommended.

AUTHOR: BIAN Fuzong [0593 1381 1350]

ORG: Water Conservancy and Hydroelectric Power Research Institute

TITLE: "Characteristics of Lateritic Soils Used as an Earth-Dam Material"

SOURCE: Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese No 4, 1980 pp 26-36

TEXT OF ENGLISH ABSTRACT: This paper presents some experiences of earth-dam construction utilizing lateritic soils that covered the vast districts of southern China. It deals with the formative conditions of lateritic soils and studies the soil properties, such as mineral-chemical composition, grain-size distribution, plasticity, compaction, compression and shearing strength. In addition, it suggests some points that should be noticed in dam design and construction when lateritic soils are to be used.

AUTHOR: DONG Xinglin [5516 5281 2651]

ORG: Water Conservancy and Hydroelectric Power Research Institute

TITLE: "Study on the Stable Cross-Sectional Area of Surge Tank"

SOURCE: Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese
No 4, 1980 pp 37-48

TEXT OF ENGLISH ABSTRACT: The design of the stable cross-sectional area of a surge tank in the past was based upon Thoma's formula which had been derived on the assumption of ideal regulation. The area calculated often tended to be larger than was actually required, resulting in not only the increase of project investment but also retardation of building speed. This paper considers the various influencing factors of stability, establishes a mathematical model of a water power station with a true regulation system, and derives a more complete equation for determining the critical cross section of a surge tank. By using this equation and through adjusting the governing parameters, a smaller cross-sectional area can be obtained than that given by Thoma's formula. It is indicated that the formulas given by Thoma and some other investigators are special cases of this equation. Also given in this paper is a simplified criterion equation for judging whether a total elimination of the surge tank in some cases is feasible.

9717

CSO: 4009

AUTHOR: NI Maoqing [0242 3185 3237]

ORG: Water Conservancy and Hydroelectric Power Research Institute

TITLE: "Analysis of Problems of the Instantaneous Unit Hydrograph"

SOURCE: Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese No 4, 80 pp 49-54

ABSTRACT: The theoretical model of the instantaneous unit hydrograph was first published by J.E. Nash in 1960 and was soon introduced to China, and instantaneous unit hydrograph was applied by many domestic units to analyze rainfall and flow volume data of medium and small streams to provide a new way of design analysis for water conservancy and hydroelectric power engineering projects of medium and small sizes. In recent years, methods of dynamics have been increasingly applied in hydrology to study the nonlinear system of large river valleys, and there have also been progress regarding solutions to problems of input and output of sediments and water flow. Based upon these advancements, this paper attempts to analyze the initial condition which produces the equation of the instantaneous unit hydrograph for the purpose of improving the hydrological mathematical model so that it may more reasonably reflect the basic theory of computing the flow volume and convergence of rivers.

The author wishes to express thanks to XIAO Tianduo [5135 1131 6993] and FAN Jiahua [5400 1367 5478] for their support and assistance.

AUTHOR: CHEN Jisheng [7115 3444 3932]

ORG: Changjiang [Yangzi] Water Conservancy and Hydroelectric Power Research Institute

TITLE: "An Approach to Confined Flow Toward a Partially Penetrating Well"

SOURCE: Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese No 4, 80 pp 55-61

ABSTRACT: This paper proposes an approximate solution to the problem of axial seepage under certain special conditions. Parallel seepage is viewed as axial seepage to provide an indirect way of producing a mathematical expression. The seepage volume calculation equation thus offered in the paper is suitable for wells of different radius and may be used, under the condition of $S/T > 0.2$, to compute incomplete wells with a penetrating bottom to produce a precision similar to the currently accepted equation. The simplified equation derived from the approximate solution has a simple structure and a clear physical concept, and is easy to apply.

AUTHOR: XIA Yuchang [1115 3022 1603]

ORG: Scientific Research Center, Tianjin Prospecting and Designing Academy,
Ministry of Water Conservancy

TITLE: "On the Evaluation of Velocity Coefficient of the Surface of Overflow Dam"

SOURCE: Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese No 4,
80 pp 62-67

ABSTRACT: For the purpose of calculating various elements of waterpower of an overflow dam, the velocity coefficient of the surface of the dam is a required important parameter. With respect to this coefficient, there have been numerous previous studies but these scientists used different methods for studying, measuring, and data processing to produce different equations. The velocity coefficient obtained using the various equations is very different to put the designer in a dilemma, not knowing which equation to choose. This paper uses the boundary layer to derive an energy loss equation. A table is given listing 21 equations for velocity coefficient of the surface of overflow dam by 18 domestic and foreign authors to emphasize the complexity of the problem.

AUTHOR: ZHAO Shijun [6392 0013 0193]

ORG: Water Conservancy and Hydroelectric Power Research Institute

TITLE: "Drawing Contour Lines on Asphalt Felt as References to Help Reproduce the Topography in Hydraulic Models"

SOURCE: Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese No 4,
80 pp 68-70

ABSTRACT: This paper introduces a method of using asphalt felt as a topographical base to draw contour lines on it to control topographical altitudes and to pile layers and layers on it according to the contour lines for simulating topography on the hydraulic model. This method is especially suitable for regions of high mountains, gorges, and valleys. It may cause the simulated topography of a high degree of complexity to be very close to the reality. In the past years, the author and colleagues have used this method to build tens of hydraulic models for several large scale hydroelectric power stations. The procedure of building this type of models is explained.

This paper was originally published as a hydraulic model making experience of the Fourth Engineering Bureau of the Ministry of Water Conservancy and Hydroelectric Power.

AUTHOR: DU Yanling [2659 1693 7881]
LI Chunhua [2621 2504 5478]
XU Jiahai [1776 1367 3189]

ORG: DU, LI of Water Conservancy and Hydroelectric Power Research Institute;
XU of Zhejiang Provincial Water Conservancy Research Institute

TITLE: "Test Set-up to Study Permeability of Clays"

SOURCE: Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese No 4,
80 pp 71-75

ABSTRACT: At present, the Darcy Law of permeability is generally used for calculating consolidation and seepage of saturated clays. The law represents an experimental relationship derived from permeability tests of dry sand particles, however. For a long time, many have studied its applicability to saturated clays with variable conclusions. There have also been some who have used non-Darcy permeability laws in aspects of consolidation theory and sandy well designing to produce totally different results. The authors believe that there is a need for making a permeability instrument specially for clays, in a closed system, with the side flow and pressure unaffected by evaporation, capable of maintaining a constant head and guaranteeing complete saturation, to be used for tests under the condition of constant temperature. Using other existing clay permeability experiment equipment as references, the authors designed and made such a test instrument in 1965. This paper describes the instrument and its merits.

AUTHOR: ZHOU Mingde [0719 0682 1795]
ZHU Datong [2612 1129 0681]

ORG: ZHOU of Nanjing Water Conservancy Research Institute; ZHU of Dalian College of Engineering

TITLE: "Additional Mass Calculation for a Pipe Line Containing Flowing Fluids in Transverse Vibration"

SOURCE: Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese No 4,
80 pp 76-81

ABSTRACT: Transverse vibration of water or oil pipelines is one of the common vibrations with the characteristic of bending along the pipeline axis. For the calculation of additional mass of this vibration, currently the method of the mass of the fluid of the unit length of the pipeline is used. This is a method nearly half a century old. This paper takes into consideration the elastic deformation of pipeline wall in the vibration process to derive a theoretical equation for computing the additional mass. Simple experiments were conducted to test the validity of the equation so as to enable it to be used in pipeline engineering universally.

AUTHOR: XIE Dingyi [6200 1353 5030]
WU Zhihui [1566 1807 6540]
XU Zhiying [1776 1807 5391]
JIANG Po [1203 2613]
MA Meiying [7456 2734 5391]

ORG: XIE, WU of Northwest College of Agriculture; XU, JIANG of East China College of Water Conservancy; MA of Nanjing Water Conservancy Research Institute

TITLE: "Comments on Problems of Strength, Liquefaction, and Failure of Saturated Sand During Cyclic Load"

SOURCE: Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese No 4, 80 pp 82-85

ABSTRACT: The original paper "Problems of strength, liquefaction, and Failure of Saturated Sand During Cyclic Load" by WANG Wenshao [3076 5113 7300] was published in SHUILI XUEBAO No 1, 80. Two papers discussing the contents of that paper have been published in the No 3, 80 issue of the journal and two more are presented here. The original paper uses the limit equilibrium theory to resolve the problem of stability in soil dynamics. Comments and disagreements concern mainly with the use of the limit equilibrium theory as an index of measuring failure to study the problem of vibration liquefaction of saturated sand. It is pointed out that limit equilibrium under dynamic load is a different conception from limit equilibrium under static load, and limit equilibrium does not imply that at that point the soil body has reached a critical state of failure.

AUTHOR: ZHOU Qunli [0719 5028 0500]

ORG: Hunan Provincial Water Conservancy and Hydroelectric Power Surveying and Designing Academy

TITLE: "Comments on the Applications of Fracture Mechanics to the Design of Hydraulic Structures"

SOURCE: Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese No 4, 80 pp 86-87

ABSTRACT: The Original paper, "Applications of Fracture Mechanics to the Design of Hydraulic Structures" by PAN Jiazheng [3382 1367 6927] was published in the No 1, 80 issue of the journal, emphasizing the necessity and urgency of fracture research in hydraulic structure designing. The author of this paper agrees with the general context of the original paper and provides additional evidence to testify to the urgent need of applying fracture mechanics in the designing of hydraulic structures. Some errors of the original paper are also corrected.

6168

CSO: 4009

AUTHORS: DU Ping [2629 1627]
YANG Sikun [2799 0843 0981]
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ORG: None

TITLE: "Studies on the Modification of Preparation of Human Leucocyte Interferon"

SOURCE: Beijing JIEFANGJUN YIXUE ZAZHI [LIBERATION ARMY MEDICAL JOURNAL]
Vol 5 No 2, Apr 80 pp 65-68

ABSTRACT: The modified method for the preparation of human leucocyte interferon developed by the Institute of Virology of the Chinese Academy of Sciences was reported satisfactorily adopted in this research. The method adopts human umbilical cord blood to replace veinal blood for human leucocyte interferon, and anticoagulative total blood to replace extract of leucocytes for interferon inducers, as specified in the "International Symposium on Standardization of Interferon and Interferon

[Continuation of JIEFANGJUN YIXUE ZAZHI Vol 5 No 2, Apr 80 pp 65-68]

Inducers". The modification has proved to be satisfactory, besides solving the problem of supply, and simplifying the procedure of human leucocyte interferon preparation.

The umbilical blood and embryo were respectively supplied by the Shanghai Yangshupu District Women and Infants Health Hospital and the Department of Gynecology and Obstetrics of the Second Military Medical university's Changhai Hospital.

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TITLE: "Correlation Technique and Its Application to His Bundle Electrocardiograms. Part II"

SOURCE: Beijing JIEFANGJUN YIXUE ZAZHI [LIBERATION ARMY MEDICAL JOURNAL]
Vol 5 No 2, Apr 80 pp 69-72

ABSTRACT: This section of the article concludes a previous study on the application of the correlation technique in His bundle electrocardiograms. It is concluded that the technique can definitely be used as an alternative to the superposition technique, and, furthermore, has the advantages of magnetophone omission, lower residual noise, higher resolution, less dynamic deviation, and higher precision. In the nontraumatic examination of conducting system diseases, both techniques are superior to the duct technique.

The electronic computer used in this study has only 1K internal storage, 16 digits, no external storage, and operation speed of 40,000 times per second.

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TITLE: "Use of Valved Conduit for Surgical Correction of the Tetralogy of Fallot with Absence of Left Pulmonary Artery: Report of One Case"

SOURCE: Beijing JIEFANGJUN YIXUE ZAZHI [LIBERATION ARMY MEDICAL JOURNAL]
Vol 5 No 2, Apr 80 pp 73-74

ABSTRACT: A case of tetralogy of Fallot with absent left pulmonary artery (mortality 44-48%) was reportedly successfully corrected with valved conduit surgery, when the right ventricle was rebuilt, and the pulmonary artery continuity restored. The valved conduit selected for the surgery is 18 mm in diameter, and was deviated rightward to become "C" shaped. No valved conduit obstruction was observed after the surgery.

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TITLE: "Effect of Polygonum cuspidatum on the Microcirculation of Skin Burn Animals"

SOURCE: Beijing JIEFANGJUN YIXUE ZAZHI [LIBERATION ARMY MEDICAL JOURNAL]
Vol 5 No 2, Apr 80 pp 75-77

ABSTRACT: 60 artificially burned rabbit ears were treated with intravenous injection of the traditional Chinese medical blood invigorative herb Polygonum cuspidatum Sieb et Zucc, and observed under microscope for the rate of blood flow, and changes of flow characteristics in the regenerated and preformed tissues. The results confirm that the herb definitely reduces exudation, resists bacteria, dilates blood vessels, and contains thrombosis. The herb has also proved to contain mainly polydatin.

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TITLE: "Plastic Surgery in Burn Contractures"

SOURCE: Beijing JIEFANGJUN YIXUE ZAZHI [LIBERATION ARMY MEDICAL JOURNAL]
Vol 5 No 2, Apr 80 pp 78-80

ABSTRACT: This article reports a statistical analysis of 905 cases of plastic surgery on burn contractures in a military hospital during the last more than 20 years. The results show that 754 cases or 83.31% were good, 145 cases or 16.02% improved, and 6 cases or 0.66% poor. From a discussion on the questions on the urgency of timely treatment, and the timing of surgery, it is recommended that surgery be performed at the earliest possible date, even prior to cicatrization, and the adoption of such techniques as skin grafting, or local skin flapotomy, or both.

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TITLE: "Effect of Pre-operative Intravenous Drip of ACTH on Post-operative Reactions"

SOURCE: Beijing JIEFANGJUN YIXUE ZAZHI [LIBERATION ARMY MEDICAL JOURNAL]
Vol 5 No 2, Apr 80 pp 81-85

ABSTRACT: Preliminary clinical observations and laboratory study on post-operative reactions of pre-operative intravenous drip of ACTH on 48 patients and mice tends to indicate that such ACTH administration promotes adrenocortical secretions and catecholamine synthesis, which preactivates adrenal sympathetic nerve's internal secretions, and thus favors improved patients' reactions to surgical wounds. The laboratory study includes pre- and post-operative changes of the internal secretions from adrenal sympathetic nerves, as well as excretions of 17-OHCS, adrenaline and VMA in 24 hours after the pre-operative ACTH drip.

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TITLE: "Significance of Digital Pulse Wave Monitor During Anesthesia"

SOURCE: Beijing JIEFANGJUN YIXUE ZAZHI [LIBERATION ARMY MEDICAL JOURNAL]
Vol 5 No 2, Apr 80 pp 86-88

ABSTRACT: The study on the effect of digital pulse wave monitor of anesthesia concludes that it is effective in monitoring: 1) the block anesthesia of ischiatic and brachial plexus nerves; 2) volumetric perivascular changes from sympathetic block of spinal and epidural anesthesia; and 3) whether the administration of ether in general anesthesia is sufficient or stable. However, it is not effective in monitoring intravenous procaine general anesthesia. Furthermore, under certain conditions, the technique may be of help in ascertaining the degree of terminal vasoconstriction and dilatation, microcirculatory conditions, and heart contractions.

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TITLE: "Studies on Some Problems of the Management of War Wounds of the Extremities and Vertebrae"

SOURCE: Beijing JIEFANGJUN YIXUE ZAZHI (LIBERATION ARMY MEDICAL JOURNAL)
Vol 5 No 2, Apr 80 pp 89-93

ABSTRACT: This article reports a statistical analysis and discussion on the follow-up treatment of firearm inflicted extremities and spinal wounds derived from the recent Vietnam self-protection war, the results and existing problems under the categories of: 1) firearm caused

[Continuation of JIEFANGJUN YIXUE ZAZHI Vol 5 No 2, Apr 80 pp 89-93]

fractures of the extremities; 2) firearm caused spinal column and cord wounds; 3) firearm caused vascular wounds of the extremities; 4) firearm caused extremities wounds complicated perimascular interspace syndromes; 5) perineural wounds and neuralgia caused by burns; 6) gaseous gangrene; 7) amputation of firearm wounds; and 8) rebuilding the function of late stage firearm wounds.

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TITLE: Extraction of Intracranial Shell Fragments Stereotactically by
Magnetic Steel Needle"

SOURCE: Beijing JIEFANGJUN YIXUE ZAZHI (LIBERATION ARMY MEDICAL JOURNAL)
Vol 5 No 2, Apr 80 pp 94-96

ABSTRACT: This article reports successful extraction of 14 cases of
intracranial shell fragments stereotactically by magnetic steel needle
as of June 1979. The techniques introduced include directed puncture
and bare-handed puncture. A discussion is also made on the advantages
of adopting such technique for intracranial shell fragment extraction,
its indications, and some surgical problems that deserve special
attention.

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CSO: 4009

Microbiology

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TITLE: "Studies on Empty-Gut Disease of Tussah. II. Identification of the Causative Agent of Empty-Gut Disease of Tussah, Streptococcus pernyi sp. nov."

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 3, Sep 80 pp 225-229

TEXT OF ENGLISH ABSTRACT: The causative agent of empty-gut disease, a newly discovered disease of tussah, is a newly discovered pathogenic bacterium for tussah, a wild silk worm of economic significance in China. This pathogenic bacterium is a Gram positive coccus, 1-1.2 μ m in diameter, mostly in pairs, with single cells or short chains seldom occurring. No spore. Non motile. In a medium containing sucrose 20 g, peptone 20 g, NaCl 5 g, meat extract solution

[Continuation of WEISHENGWU XUEBAO Vol 20 No 3, Sep 80 pp 225-229]

1 liter, pH 7.5, abundant growth is produced. On agar plate the colonies are circular, entire, convex, smooth, opaque, 1.5-2.0 mm in diameter and pale yellow in color. In liquid culture, uniform turbidity is formed at first, and abundant flocculent precipitates are produced three days later. Catalase negative. Lactic acid, but no gas, is produced from glucose, i.e., homofermentative. Growth occurs at both 10°C and 45°C, at pH 9.6, in 6.5% NaCl and in 0.1% methylene blue milk, and is able to be initiated within the pH range from 6.4 to 11.5. No growth occurs at pH 4.9. The final pH of broth culture is between 4.9 and 5.15. Arginine is not utilized and no ammonia is produced from it. Folic acid is not required for growth. Acid is produced from litmus milk and litmus is reduced. Acid is produced from arabinose, xylose, fructose, lactose, maltose, sucrose, raffinose, dextran, glycerol, mannitol, sorbitol and rhamnose, but not from sorbose, inositol and erythritol. β -haemolysis is produced on rabbit blood agar plate.

Serological analysis shows that the antigenic structure of this tussah pathogen is complex. It contains not only Lancefield group D and group Q antigens with lower titer, but also a unique unknown antigen group of Lancefield with higher titer. Its antiserum does not react with antigens of Lancefield groups A, B, C and N.

Accordingly, the morphological, physiological, biochemical and serological characteristics of the organism in question are identical with those of Genus Streptococcus, but differ from those of all known species. This causative agent of empty-gut disease is designated as a new species of Streptococcus, Streptococcus pernyi sp. nov., and culture 78501 is assigned as the type strain, deposited in Type Culture Collection, Chinese Academy of Sciences, as AS 1.1010.

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TITLE: "Corallocytostroma Yu et Zhang, Gen. Nov., a Stromatic Coelomycetes"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese
Vol 20 No 3, Sep 80 pp 230-235

TEXT OF ENGLISH ABSTRACT: A new fungal disease of rice has been found in Yunnan Province of China causing considerable damage to the rice culture, especially the foreign varieties. The symptoms of this disease are characterized by dwarfing of the plants, increasing the tillers, shortening the internodal elongation and reducing the number of nodes. The disease is also characterized by forming superficial, solitary stroma which replace the spike. The causal organism of the disease has been identified as a new genus of the order Sphaeropsidales in the class Coelomycetes belonging to Deuteromycotina.

Corallocytostroma oryzae gen. et sp. nov. is characterized by the following diagnosis: Stomata superficial, solitary, depressed-globose or peach-shaped,

yellowish brown or purplish brown, coniferous or furfuraceous at maturity, opening by irregular fissures; locules coralloid or convoluted, without any ostiole; conidiophores hyaline, aseptate, smooth, palleade-like, dense, obclavate, slender, formed from the inner cells of the locular walls; conidia hyaline, aseptate or septate (probably with distoseptae when septate), catenate, elongate-elliptical or elongate-oval, allantoid or vermiform, smooth, guttulate. The characteristics of the conidiogenous cell and the ontogeny of the conidium are not clear because of the failure to isolate and culture the fungus.

The morphological characteristics outlined above clearly indicate the necessity of erecting the new genus, Corallocytostroma. Nevertheless, there are some superficial similarities between the new genus and Creothyriella Batista et Costa, Cytospora Ehrenb., Kendrickomyces Sutton et al., and Phaeocytopora Sutton. The new genus is distinguished from Cytospora and Kendrickomyces by its superficial and solitary stromata, non-ostiolate and coralloid locules, hyaline and aseptate conidiophores, as well as its hyaline, catenate and septate or aseptate conidia. It differs from Phaeocytopora in not having immersed stromata, ostiolate locules, branched and septate conidiophores, as well as colored and aseptate conidia. The genus Corallocytostroma is also distinct from the genus Creothyriella in not possessing clypeate stromata, globose locules and aseptate conidia.

The type specimen of the new species is deposited in the Herbarium Mycologicum, Chinese Academy of Sciences, Beijing, China.

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TITLE: "A New Genus of Polyporaceae from China"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese
Vol 20 No 3, Sep 80 pp 236-239

TEXT OF ENGLISH ABSTRACT: In 1957 when the first author made a mycological survey in the Simao District of Yunnan Province, China, many small-sized specimens of this genus were collected. At that time he only noticed their particular morphological features, but no detailed studies were made. About 20 years later similar forms of these particular specimens were collected once more by comrade HAN Shujin and the authors from Hainan Island, Guangdong Province, in 1977.

After studying in detail and noting references made with many descriptions, we considered these collections to be a new species of Polyporaceae. According to its leathery to corky caps and hymenium lining the inner surface of tubes, this species should belong to this very family. In particular, it is characterized

[Continuation of WEISHENGWU XUEBAO Vol 20 No 3, Sep 80 pp 236-239]

by its sparse, single and free tubes, the surfaces of which are covered with densely caespitose tomenta and interwoven reticula. Moreover, the bases of the tubes are always embedded in the context. By these diagnostic characteristics this new species appears apparently not to be included in any other genera of Polyporaceae. Consequently a new genus is established here for it.

Superficially this genus is similar to some other genera which are included in other families on the morphological features, but it differs from those genera in the presence of its particular characteristics. As mentioned above, this genus has nothing in common with the genera of Boletaceae, of which the genus Ixechnus Heim seems to resemble this genus from the sparse tubes, but the former is well marked by its flesh and stipitate fruit bodies. The genus Fistulina is also fleshy and its hymenophore consists of densely crowded free tubes. The cyphelloid fungi, such as Stromatocypha (Porotheicum), Henningsomyces (Solenia) and Lachnella (Cyphella and Solenia; Cunningham, 1963, p 307), are also similar to this new genus, but they are easily recognized by the membranous texture of thin subiculum or smaller caps, seldom exceeding 1.5 mm in diameter, each attached to the substratum by a brief base or vertex.

In a word, this genus is distinct from all other similar genera. If more ontogenetic information of this genus were obtained in the future, a reasonable

taxonomic system would be found.

All the materials cited above are deposited in the mycological herbarium of the Institute of Microbiology, Chinese Academy of Sciences, Beijing, China.

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TITLE: "Some Freeze-Etched Aspects of Vaccinia Virus in the Process of
Development"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese
Vol 20 No 3, Sep 80 pp 240-245

TEXT OF ENGLISH ABSTRACT: An electron microscopic study has been carried out on vaccinia virus infected HeLa cells by using the advantage of the freeze-etching technique, which is characterized by preferentially splitting biomembranes and giving the specimens a stereo-appearance. Some new information has been achieved and is summarized as follows:

1. The fracture faces and intramembrane granules:

The fracture planes of the immature virus particles varied according to the degree of maturation; at the initial stage the particles just being formed were always flatly fractured. With further development, when the particles became smaller

and denser they were in turn fractured through in between the bilayer of the envelope. Consequently two different faces appeared. The convex face was interpreted as the outer surface of the inner leaflet of the envelope and the concave face as the inner surface of the outer leaflet. Most of the intramembrane granules were found on the convex faces of the envelopes.

2. The granule free area:

This was characterized by a smooth membranous structure eccentrically located on the periphery of the intermediate particle. As the area was often seen associated with an underneath nucleoid structure, it was also designated as the envelope of the nucleoid (core).

3. The hexagonal shape found in the intermediate particles:

As shown in figures I and II, the hexagonal shape is as distinct as an icosahedron virus. This shape has never been seen so far, either in an ultrathin section or in negative stained specimens.

4. The crystalline structures found in the virus producing matrix:

The structure consisted of regularly arranged subunits; among them some hexamer relationships could be revealed and these were thought to be precursor materials to the making of the envelopes.

Some drawings illustrating the presumptive stereo-morphology of the immature vaccinia virus were also presented.

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TITLE: "Studies on the Production of Vitamin C Precursor--2-Keto-L-Gulonic Acid from L-Sorbose by Fermentation. I. Isolation, Screening and Identification of 2-Keto-L-Gulonic Acid Producing Bacteria"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 3, Sep 80 pp 246-251

TEXT OF ENGLISH ABSTRACT: 1615 strains of L-sorbose-utilizing bacteria were isolated from 670 samples by the enriched culture method in a medium containing L-sorbose as the sole source of carbon. Bacteria N1197A is a strain capable of producing vitamin C precursor--2-keto-L-gulonic acid from L-sorbose. It is a

mixed culture of two different species of bacteria. The bacteria which produces larger colonies on the cultural plate does not produce any 2-keto-L-gulonic acid. The other bacteria, which produces minute pinpoint colonies on a cultural plate, can produce 2-keto-L-gulonic acid, but in small amounts. The former one is Pseudomonas striata and the latter one is Gluconobacter oxydans.

The fermentation product isolated and purified from the culture broth is a white crystal. It has been identified as 2-keto-L-gulonic acid by paper chromatography, elementary analysis and infrared absorption spectrum, etc.

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TITLE: "Expression of Cloned DNA Ligase Gene (G30) of E. coli Bacteriophage T₄ In Vivo"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 3, Sep 80 pp 252-256

TEXT OF ENGLISH ABSTRACT: T₄ DNA ligase was extracted and purified from clones of T₄ DNA ligase gene by means of DEAE-cellulose and phosphocellulose column chromatography. Its behavior on the columns was the same as that of the ligase extracted from T₄ infected E. coli cells. The activity measurement of the

[Continuation of WEISHENGWU XUEBAO Vol 20 No 3, Sep 80 pp 252-256]

enzyme also showed typical T₄ ligase activity.

The results provide evidence that a cloned T₄ ligase gene is able to express in vivo.

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TITLE: "Studies on Double-Stranded RNA Viruses. IV. In Vitro Synthesis of the mRNA of Cytoplasmic Polyhedrosis Virus of Silkworm Bombyx mori"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 3, Sep 80 pp 257-262

TEXT OF ENGLISH ABSTRACT: The particles of dsRNA viruses, such as reovirus, rice dwarf virus and cytoplasmic polyhedrosis virus, are associated with a dsRNA dependent RNA polymerase. In general, the enzyme activity of RNA polymerase is detected by incorporation of radioactive precursor nucleoside-triphosphate into an acid insoluble product and the separation of the RNA replicated in vitro is rather tedious. In this report, we devised a simple and convenient method for the detection of the enzyme activity of replicase and the simultaneous collection of the mRNA of CPV.

The mRNA replicated in vitro could be effectively separated from the reaction

mixture through DEAE-Sephadex A-25 column, so that the enzyme activity of the replicase of CPV purified by gel filtration was sufficiently high to be estimated without using radioactive substrates.

The results indicate that the mRNA replicated in vitro are single-stranded RNA and the optimum pH for the replicase is 8.0. Electronmicroscopic observations revealed that the particles of CPV isolated from the reaction mixture were intact particles. In the absence of S-adenosyl-L-methionine, the RNA synthesis of replicase of CPV was found to be negligible.

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TITLE: "Glucoamylase of Monascus sp. III. Comparison of the Two Molecular Forms"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 3, Sep 80 pp 263-270

TEXT OF ENGLISH ABSTRACT: The glucoamylase from Monascus sp. exists in multiple molecular forms. The two major forms, E₃ and E₄, have been purified and proved to be homogeneous by disc gel electrophoresis. Their chemical compositions and some basic properties have been compared with the following results. The amino acid compositions of the two forms are similar, merely differing by 6 serine and 3 arginine residues, and less than 2 for the other amino acids.

The amino- and carboxyl-terminal amino acids of E₃ and E₄ are identical, the carboxyl terminus being tyrosine, but it was unexpected that two amino-termini (Asp and Ser) were found in both forms which were composed of single peptide chains.

Both forms are glycoproteins, containing 7 and 9 percent total sugars as mannose. The component sugars are mannose, galactose and a trace of xylose and glucose.

The molecular weights of the two forms are without significant difference, being about 54,000 daltons as estimated by gel filtration or SDS-poly-acrylamide gel electrophoresis. The isoelectric points (pI) of the two forms differ slightly, being 4.00 for E₃ and 4.10 for E₄.

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TITLE: "Further Studies on the Mechanism of the Agglutinating Action of Streptococcus lactis in Starch Production"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese
Vol 20 No 3, Sep 80 pp 271-275

TEXT OF ENGLISH ABSTRACT: In a previous paper we showed that in the Chinese traditional "sour liquid" method of starch production, it is neither the acidity nor any of the fermentation products, but the microorganism itself that causes the precipitation of starch grains. The microorganism contained in the liquid agglutinates starch, thereby making the dispersed starch grains aggregate into big masses. The agglutinating action between the microorganism and the starch grains requires certain conditions: an optimal pH, a proper temperature and the presence of certain cations. Monovalent cations and certain divalent cations, such as Sr²⁺ and Ba²⁺, have no effect, while Ca²⁺ has a weak effect.

[Continuation of WEISHENGWU XUEBAO Vol 20 No 3, Sep 80 pp 271-275]

Among the di-, tri- and tetravalent cations tested, the agglutinating effect increases with the valency. The responsible microorganism has been isolated and characterized as a variety of Streptococcus lactis.

In the present paper, experiments were designed to study the effect of various physical and chemical factors, together with a series of enzyme preparations, on the agglutination between the bacteria and starch grains. All treatments which are known to denature proteins led to the loss of agglutinating ability of the bacteria. These included: heating, treatment with phenol, trichloroacetic acid, formaldehyde and lysol, ultraviolet radiation, ultrasonic waves, etc. Among the various enzymes tested, cellulase, pectinase, lipase, pepsin, trypsin, papain and lysozyme did not destroy the agglutinating ability of the bacteria, whereas chymotrypsin completely abolished it. Chymotrypsin which had been inhibited by a kunitz inhibitor no longer destroyed the agglutinating action of the bacteria.

According to the above experiments, it is believed that some special proteins, perhaps lectins, on the bacterial surface are responsible for the agglutinating action between the bacteria and the starch grains.

In this paper, the quantitative relations among the bacteria, starch grains

[Continuation of WEISHENGWU XUEBAO Vol 20 No 3, Sep 80 pp 271-275]

and cations were also studied. The positive quantitative relationship among them seems to suggest that in the agglutination reaction, these three are in some fashion bound together. The nature of the binding sites remains to be investigated.

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TITLE: "A Starch-Agglutinating Factor on the Cell Wall of Streptococcus lactis Strain. I. Electron Microscopic Observation"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 3, Sep 80 pp 276-279

TEXT OF ENGLISH ABSTRACT: In China, a sour liquor (suanjiang) containing a complex microbial flora was traditionally used for starch agglutination and precipitation in starch factories. The starch-agglutinating potency is due to the action of certain bacteria strains in this liquor. An effective strain of Streptococcus lactis was isolated in pure culture by the authors of the present work. The contact interfaces of the starch granules and bacteria were observed under SEM. The micrograph shows that the bacteria connect to the starch granules

[Continuation of WEISHENGWU XUEBAO Vol 20 No 3, Sep 80 pp 276-279]

just like a chain or string is holding them together. The outer side of the bacteria cell wall is attached to the starch surface firmly. From the specificity and direct evidence of SEM micrographs, it can be ascertained that the agglutination capacity is biochemical in nature. It suggests that there is a chemical factor on the bacterial cell wall. This factor is a kind of protein as proved by chymotrypsin treatment. As a functional protein it can be obtained from the purified cell wall, or even can be obtained in the ultracentrifugal supernatant after lysozyme treatment. This active protein seems to be a lectin-like substance.

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TITLE: "Preliminary studies on the Correlation between Induced Nitrate Reductase and Nitrogenase in Azotobacter vinelandii"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese
Vol 20 No 3, Sep 80 pp 280-284

TEXT OF ENGLISH ABSTRACT: Nitrate reductase was induced in Azotobacter vinelandii cell suspension in 0.1 M NaNO_3 for intervals of several hours and the activity of the cell free extract reached a maximum of 21.9 nMoles $\text{NO}_2^-/\text{min mg}$ protein at 24 hours. The nitrogenase activity of the cell extract of these induced cells declined more rapidly than did that of the uninduced one. Experimental evidence indicates that this phenomenon is due to the inactivation of component II (Fe protein) but not component I (Fe-Mo protein) of nitrogenase during the induction period.

Cells of Azotobacter vinelandii U₄₅ mutant (known as lacking in Fe-Mo cofactor)

[Continuation of WEISHENGWU XUEBAO Vol 20 No 3, Sep 80 pp 280-284]

also showed induced nitrate reductase activity by the same treatment, suggesting that the two Mo-containing enzymes do not share a common subunit.

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TITLE: "Study on the Separation of Crystals from Spores of Bacillus thuringiensis"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese
Vol 20 No 3, Sep 80 pp 285-288

TEXT OF ENGLISH ABSTRACT: By using the isopycnic centrifugation in a Urografin gradient and the fluid diphasic systems, we have purified crystals from nine strains of Bacillus thuringiensis (belonging to six varieties). The highest purity of all these crystal preparations separated with both procedures was over 99 percent, but in the latter method the crystal preparations are sometimes contaminated with some vegetative rods or sporangium membranes. The results obtained by both methods were compared.

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TITLE: "Studies on the Wheat Rosette Stunt Virus"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese
Vol 20 No 3, Sep 80 pp 289-295

TEXT OF ENGLISH ABSTRACT: Wheat is seriously attacked by rosette stunt disease in north China. Some reports have indicated that the disease was transmissible by the planthopper (Laodelpha striatellus Fallen) and numerous bullet virus particles have been observed in the cell of the diseased plants and its vectors. We purified the virus from the diseased plant and injected it into the non-viruliferous nymphs of L. striatellus Fallen. After inoculation, the insects were transferred onto the healthy wheat plants which then produced typical rosette stunt symptoms, thus demonstrating the infectivity of this bullet virus, i.e., wheat rosette stunt virus (WRSV).

In order to investigate the host range of the WRSV, 27 gramineous plant species, including both the cultivated and wild species, were tested. The results of the inoculation studies demonstrated that 17 species, representing 6 tribes of the gramineae, were proved to be hosts. Of these, 15 species exhibited symptoms, 2 species with no symptoms also carrying the virus.

Among the 43 varieties of wheat tested, 2 of them were proved to be resistant to the disease.

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TITLE: "The Immobilized Cells of Candida rugosa Possessing Fumarase Activity"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese
Vol 20 No 3, Sep 80 pp 296-302

TEXT OF ENGLISH ABSTRACT: The immobilized cells of Candida rugosa C90 possessing fumarase activity were prepared by different methods, and the most active immobilized cells were obtained by entrapment in polyacrylamide gel.

The enzymatic properties of immobilized Candida rugosa C90 cells were investigated and compared with those of the native cells. The effects of pH, temperature and bivalent metal ions on the reaction rate of both immobilized and native cells are the same. The heat stability of the immobilized cells was somewhat higher than that of the native ones. Bivalent metal ions, such as Mn^{++} , Mg^{++} , Ca^{++} and Fe^{++} , could not protect the enzyme from thermal inactivation.

The enzyme activity remained constant during 91 days of storage at 4-6°C.

The immobilized cell column can be used for continuous production of L-malic acid from 1 M fumarate at 30°C. When a solution of 1 M substrate (pH 8.5) was passed through an immobilized cell column at a flow rate of space velocity (SV) = 0.38, the highest conversion rate of 82-85 percent was attained. The immobilized cell column operated steadily for two months. The half-life of the fumarase activity of the immobilized cell column at 30°C was 95 days.

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TITLE: "Bacterial Leaching of Cobalt from Arsenic-Containing Sulfide Ores"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese
Vol 20 No 3, Sep 80 pp 303-309

TEXT OF ENGLISH ABSTRACT: A strain of Thiobacillus ferrooxidans capable of degrading arsenopyrite and tolerating arsenic has been isolated from acidic mine

water of the arsenopyrite deposit. The best conditions for leaching of cobalt from arsenic-containing sulfide ores by this organism have been established as follows: pH 2-2.3, temperature 32°C, aeration rate 0.19-0.21 VVm, sample particle size -160 mesh, solid concentration 20 percent. After leaching for 5-7 days in a laboratory experiment, the leaching rate of cobalt was about 80 percent and occasionally 90 percent.

Fourteen batches of the pilot plant experiment were carried out in draft tube tanks; the raw material being treated was 0.4 tons (6 batches), 3 tons (5 batches) and 4 tons (3 batches) respectively. The average leaching rate was 77.8 percent, but the leaching time was 2-3 days longer than that of the laboratory experiment.

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TITLE: "Studies on Some Factors Influencing the Hemagglutinating Properties of Adenovirus"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese
Vol 20 No 3, Sep 80 pp 310-315

TEXT OF ENGLISH ABSTRACT: The activities of adenovirus hemagglutinin (HA) prepared in human embryonic kidney cell culture are described. The influencing factors, such as erythrocytes from different individual monkeys, their concentrations, incubation temperatures and pH of the diluent, are studied. Results obtained show that the hemagglutinating titers of types 3, 7, 11, 14 and 21 adenovirus are not only influenced by the different individual monkey red cells, especially those of types 3, 7 and 14, but also by the different concentrations of red cells, incubation temperatures and pH of the diluent. The optimal conditions for adenovirus HA test are as follows: using sensitive monkey red cells, 1 percent red cell suspension, 1/50 M pH 7.6-8.0 PBS, 1 hour incubation at 37°C.

Human embryonic kidney and HeLa cells can be used for the preparation of adenovirus HA. The human embryonic kidney cell cultures are infected with 10^3 - 10^5 TCID₅₀ of adenovirus. After CPE appears complete, the supernatants showing the highest HA titer are collected. The HA titer of type 7 adenovirus cultured in the human embryonic kidney cells is significantly higher than that of type 3 adenovirus.

The HA activity of the adenovirus is stable for several months at 4°C, that of types 7 and 11 decreased at 45°C for 15 minutes and that of types 3, 7 and 11 lost completely at 60°C for 30 minutes. Ultraviolet treatment, repeated freezing and thawing and ultrasonic treatment could also result in decreasing of the HA titer.

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TITLE: "Study on the Outer Envelope Vaccines of Leptospira. I. The Preparation, Properties and Immunogenicity of the Outer Envelope Vaccine of Leptospira"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese
Vol 20 No 3, Sep 80 pp 316-322

TEXT OF ENGLISH ABSTRACT: This paper reports the study of outer envelope vaccines of Leptospira. The salt-altered cell (SAC) and the outer envelope of L. icterohaemorrhagiae and L. pomona were filtered through the millipore filters (SAC, 0.85-1.2 μ m and 0.45 μ m). This modified method is found to be simple and more rapid since no special equipment is required, and it is a new way to prepare

the outer envelope vaccine of Leptospira in large quantities.

The shape of the outer envelope of Leptospira under an electron microscope was found to be round or irregular. The chemical composition varies with different groups; that of L. icterohaemorrhagiae contains, by weight, 37.77 percent protein, 22.21 percent carbohydrate and 17.77 percent lipid; that of L. pomona consists of 59.72 percent protein, 13.69 percent carbohydrate and 14.90 percent lipid by weight. The outer envelope was susceptible to pH 12 heat, which gave the suggestion that some of the protective antigen may be heat-labile. The antibody level of the rabbit immunized with the outer envelope vaccines was higher than that of the commercial vaccines and it could be maintained for at least six months.

An experimental leptospiral outer envelope vaccine (icterohaemorrhagiae and pomona group) was evaluated for its protective efficacy in hamsters and/or guinea pigs by the development of clinical diseases or renal shedding of Leptospira after challenge. In hamsters a dose as small as 0.1 ml protected 100 percent of the animals against challenge with L. icterohaemorrhagiae, while 100 percent of the control hamsters died after challenge. A dose of 0.2 ml protected 100 percent of the vaccinated guinea pigs from clinical diseases and renal shedding, while the control guinea pigs all died. It was considered that the outer envelope vaccine possesses significant protection potency.

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TITLE: "Preliminary Studies on the Purification of Envelope and Cell Wall of Chlamydia trachomatis and Examination of Their Structures"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese
Vol 20 No 3, Sep 80 pp 323-327

TEXT OF ENGLISH ABSTRACT: The envelope and cell wall of purified Chlamydia trachomatis IF-55 were prepared by ultrasonic treatment, enzymic digestion and differential centrifugation. Used for their purification was 5-50 percent meglumini diatrizoate density gradient centrifugation. The reproducible bands of the envelope and cell wall were obtained.

Ultra-thin sections and freeze-etched preparations of intact cells, and negatively

[Continuation of WEISHENGWU XUEBAO Vol 20 No 3, Sep 80 pp 323-327]

stained envelope and cell wall were examined by electron microscope.

The envelope of the elementary bodies was found to consist of three layers, as described by previous workers. Closely packed and regularly arranged subunits, about 28 nm in dimension, were observed in the cell wall. Other details of the cell fine structure were also described.

The polypeptide components of the envelope and those of the cell wall have also been analyzed by SDS-polyacrylamide gel electrophoresis.

The properties of membranes in C. trachomatis and Gram-negative bacteria are compared.

9717

CS0: 4009

AUTHOR: LIU Yuren [0491 5280 0117]

ORG: State's Science Committee

TITLE: "An Imperative Course for Modernization--the Science of Economic Results"

SOURCE: Beijing XIANDAIHUA [MODERNIZATION] in Chinese No 9, 16 Sep 80 pp 8-9

ABSTRACT: Adoption of modernized techniques, equipment, materials, work procedures, and management methods should raise the labor productivity and reduce the cost, but in some cases, the economic benefits of these measures may not be good. In China, the number of tractors increased 3.7 fold from 1965 to 1975, but the machine cultivated acreage increased only 1.13 fold in the same period. The main reason is the fact that agricultural machines are not assembled in sets in China to cause a large number of tractors to be used for transport only. China has fewer computers than advanced countries, but almost 1/3 of the available computers are not being used. Railroad electrification is a high investment venture. It is supposed to make the train faster, more efficient, and carry more cargo, but the electrified line from Yangpingguan to Ankang in Shaanxi is used very little due to lack of cargo. These facts are used by the author to explain the importance of the science of economic efficiency in modernization in order that there may not be waste and badly coordinated construction.

AUTHOR: LIN Yutao [2651 7183 3447]

ORG: None

TITLE: "On Modern Torpedoes"

SOURCE: Beijing XIANDAIHUA [MODERNIZATION] in Chinese No 9, 16 Sep 80 pp 12-13

ABSTRACT: The paper starts the story of torpedoes with the martyrdom of Deng Shichang [6772 0013 2490] during the first Sino-Japanese War and its invention by Robert Whitehead of England. Since then, torpedoes have changed a great deal. Modern torpedoes are almost all guided. The sonar of the torpedo itself obtains the information for self-guidance and controls the horizontal and directional rudders of the torpedo to guide it toward the target. Torpedo designers install water spraying engine to imitate squids and cover it with simulated dolphin skin to reduce the water resistance to half. These and other modern features of torpedoes are told.

AUTHOR: ZI LI [5261 4539]
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ORG: None

TITLE: "Optical Fibers of the 80's"

SOURCE: Beijing XIANDAIHUA [MODERNIZATION] in Chinese No 9, 16 Sep 80 pp 22-23, 21

ABSTRACT: In 1880, Alexander Graham Bell tested his "light transmitted talking machine" but he failed to make it work. Today, a century later, optical fiber communication has become a reality. According to theoretical estimate, one laser should be able to simultaneously transmit all the telephones, telegraphs, and television of all of America, or to convert all the words in the 30 volumes of Encyclopedia Britannica into signals within 1/10 of a second. In Chicago USA, the telephone company uses an optical cable made of 24 glassfibers to transmit telephone, facsimile, and computer data; the cable is capable of transmitting all the contents of all the issues of National Geographic published in the last 100 years in one second. In 1979, Japan built an optical fiber center to serve as a computer headquarter and a television broadcasting station as well. These and other facts about optical fibers are discussed, but there is no mention of optical fiber research in China.

AUTHOR: ZHANG Yongnian [1728 3057 1628]

ORG: Anhui Provincial Electric Power Design Academy

TITLE: "Bright Future for Pipeline Transportation of Chemical Energy"

SOURCE: Beijing XIANDAIHUA [MODERNIZATION] in Chinese No 9, 16 Sep 80 pp 40, 17

ABSTRACT: In thermoelectricity generation, only 30-40 percent of the total energy of the fuel is utilized. If the need is for heat energy, the electric energy must be converted back to heat energy. This is an extremely unreasonable way of using energy, yet electricity is very convenient to deliver and very little is lost when it is transported a long distance away. Methane is a good chemical energy and much more efficient than electricity as a heat energy. Recent experiments have disclosed that methane is very soluble in water. Under the high temperature condition of 100-1100°C, methane and water mixture will heat decompose into carbene monoxide and hydrogen which can be transported to the customer in a pipeline. At present, pipeline transportation of chemical energy is still in an experimental stage. When it is officially applied in industries, even if it raises the energy conversion efficiency only 10 percent, several tens of millions tons of coal may be saved every year. Chemical energy may also be conveniently stored for use when it is needed.

6168

CSO: 4009

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ORG: Institute of Oceanography, Chinese Academy of Sciences

TITLE: "Major Tasks of China's Marine Biology in the New Era"

SOURCE: Beijing HAIYANG KEXUE [OCEANOGRAPHY] in Chinese No 1, 9 Jan 80 pp 1-5

ABSTRACT: In the new era, the first responsibility of every scientific field is to ~~serve~~ the realization of 4 modernizations. The one important problem facing the new China is how to raise the quality and the quantity of foods so as to improve the people's livelihood and strengthen their physical health. This is the major task now and in the coming decade of biology as well as marine biology. In reality, it is to raise the bio-productivity of the coastal seas of China. In the ~~first decade after~~ the liberation, the annual yield increase of marine products was close to 25 percent. In the 2 decades following, the total increase was 50 percent. Not only the rate of increase dropped, so did the quality of the products. The main reason was excessive catch and blind enclosure of the beaches to turn them into cropland. With some marine animals and plants, the case is different. Artificial breeding and culture have increased the number of species as well as the quantity of yield. *Laminaria japonica* Aresch is the typical example. The future of China's marine biology rests in intensive and extensive farming of the coastal seas, in the author's opinion. The paper includes lengthy data of accomplishments in Japan, which the author rates as the most developed country of the world in marine products.

AUTHOR: FANG Zongxi [2455 1350 3556]

ORG: Shandong College of Oceanography

TITLE: "Marching Toward the Seas to Serve Four Modernizations"

SOURCE: Beijing HAIYANG KEXUE [OCEANOGRAPHY] in Chinese No 1, 9 Jan 80 pp 6-7

ABSTRACT: China is a coastal country, with a shoreline as long as 18,000 km. Now that Lin Biao and the gang of four are down and the spring of science is here, the condition is perfect for developing China's oceanography to serve 4 modernizations. For this, the author proposes: (1) Systematic survey and research of China's ~~off-shore~~ petroleum resources; (2) Carrying out basic research of tides, currents, topography, etc. for the development of power resources of the sea, with emphasis on problems of electric power generation with the energy of the sea; (3) Studies for enlarging the farming acreage of the sea and for increasing the number of species for breeding and culture; (4) Developing research of oceanographic ecology in conjunction with the grave problem of pollution of the oceans. The quality of the ocean environment must be protected so that the yield of marine products may not contain pollutants which may harm the health of the people.

AUTHOR: QIAN Zuoguo [6929 0146 0948]
SUN Mingkun [1327 2494 2492]

ORG: Both of Shandong College of Oceanography

TITLE: "Oceanic Environmental Chemistry of Polychlorinated Biphenyls"

SOURCE: Beijing HAIYANG KEXUE [OCEANOGRAPHY] in Chinese No 1, 9 Jan 80 pp 23-29

ABSTRACT: Polychlorinated biphenyl is an artificially synthesized organic chloride having some similarity with the insecticide DDT in molecular weight, structure, and chemical property. Due to its chemical stability and its noninflammable and insulating characteristics, it has become a superior industrial material, widely used in electrical instruments, paper-making, pharmaceuticals, etc. mainly as heat carrier, plasticizer, lubricant, paint, etc. Due to losses in the production process and improper treatment of waste, PCB has become a global environmental contaminant. PCB enters the oceans through the atmosphere, the city sewer, the discharged industrial liquid waste, the streams, and the peeling paint of ships. In the coastal seas of Japan, the accumulation of PCB is estimated to be more than 30,000 tons, although in some countries, the use of PCB has been prohibited. Some believe PCB is not bio-degradable. This view is undoubtedly incorrect. Japan has reported 2 types of PCB eating yeasts, capable of decomposing 40 and 30 percent of PCB respectively. The relative stability of PCB may cause it to be useful as a tracing agent of organic geochemistry to study its transfer and distribution in the various circles of the sea and the land.

6168

CSO: 4009

AUTHOR: CHEN Yuqiong [7115 3768 8825]

ORG: None

TITLE: "The Relationship of Heat and Cold to Earthquakes"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 3, 26 Jun 80 pp 10-12

ABSTRACT: An analysis of 54 earthquakes of magnitude 7 and above, including 13 of magnitude 8 and above, between 780 BC and the present, shows that the vast majority of them fell in the four major cool periods during this time span, or on the boundaries of these periods. Between 1800 and 1876, four periods of earthquake activity in China can be recognized, and these tend to correspond to relatively cold periods over that time span. An analysis of earthquakes of magnitude 6 or above over the period 1951-65 gives the following results: earthquakes in North and Southwest China tended to occur when the preceding year had had an above-average annual temperature and winter temperature; in the Northeast they tended to occur in a year after a year with an above-average winter temperature; in the Northwest there was also a connection with a preceding warm winter, but to a less pronounced degree. The few earthquakes in South China seemed to follow cold winters. Both the Tangshan and Yongshan Pass earthquakes were preceded by unusually warm years and relatively high winter temperatures.

AUTHORS: YANG Zhenxiang [2799 2182 4382], MAO Yiping [3029 0076 1627]

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TITLE: "An Experiment with Bedrock Markers on a Monitoring Station Baseline"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 3, 26 Jun 80 pp 30-31

ABSTRACT: The accuracy of a horizontal baseline with reference points set in the surface layer and one with reference points fastened to bedrock was compared. In each case the east-west leg crossed a fault, while the north-south leg did not. The determination in the E-W leg was affected by air pressure and subsurface water, and that in the N-S leg only by subsurface water. The surface markers were mounted in concrete structures which extended a maximum of 1.5 meters below ground and had a base measuring 1.5 x 1.5 meters. The bedrock-mounted markers consisted of two concentric tubes, with the inner tube driven 6 meters into bedrock and extending between 16.2 and 19.7 meters below the ground surface. The measurement error was about 0.3-0.4 mm. A relatively large seasonal variation was observed in the E-W leg of the surface-mounted marker. A sharp change (+0.90 mm) was observed in the N-S leg of the surface marker line in May-June 1978 as a result of subsurface water changes. The total change in the N-S baseline of the bedrock-mounted markers was only 0.23 mm. Experimental results indicated that the bedrock-mounted markers were more stable.

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ORG: None

TITLE: "The Water Radon Dynamics of the Shankou No 4 Well"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 3, 26 Jun 80 pp 34-35

ABSTRACT: Large fluctuations were noted in the water radon content of the Shankou No 4 well in Hebei. For comparison purposes, in 1974 comparison samples began to be taken from the Shan No 5 well, 150 meters south of the Shankou No 5 well, which was used by the peasants. In the period 1974-78 it was found that water radon levels in the latter well tended to be opposite to those in the former. A suggested explanation is as follows: the Shan No 5 well is relatively shallow (10.83 m) and extends into rock with relatively high water radon content. Irrigation withdrawals from this well tended to deplete the surrounding rock of radon-rich water, with the result that the nearby Shankou No 5 well (189.24 m deep) was supplied with water primarily from deeper layers which were relatively radon poor.

AUTHOR: WU Bing [0702 0365]

ORG: None

TITLE: "The Effect of Temperature on Gravitational Constant Observations"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 3, 26 Jun 80 pp 36-38

ABSTRACT: Among the factors which can affect gravimetric readings are temperature changes, nearby buildings, air pressure, and tides. Measurements on two model GC-2 gravitational instruments show temperature dependences of 6.25×10^{-6} T and 6.78×10^{-6} T. Readings taken with GS-15 instruments showed a pattern of higher readings in the warmer summer months. For maximum accuracy, the proper operating temperature settings should be chosen; best results for the instruments in question were achieved with the 40-45° C setting. Changes in room temperature had a slight effect on the interior temperature of such instruments. Changes in the external temperature can cause drift in the recording curve in two ways: by changing the elasticity of the elastic system, and by producing uneven temperature changes in the mount. To minimize interference, the observation conditions should be chosen such that the temperature effect is minimal, and regression analysis should be used to exclude interference effects.

AUTHOR: None

ORG: Propaganda Department, Tangshan Municipal Committee, CCP

TITLE: "The New Tangshan Under Construction"

SOURCE: Beijing DIZHEN ZHANKIAN [SEISMOLOGY FRONT] in Chinese No 4, 26 Aug 80 pp 2-3

ABSTRACT: The guidelines for the reconstruction of Tangshan are "large-scale decentralization, small-scale centralization, integration of city and countryside, beneficial to production, convenient to live in." The old section of Tangshan (population 250,000) will be the city's economic, cultural and governmental center. This section, the eastern mining section (100,000) and the new district (100,000) are spaced about 25 km apart at the apices of a triangle, with the central area being agricultural. A coal-bearing area south of the old city will be made a scenic area. The reconstructed city will have about the same area of buildings as before, about 14 million square meters, including 7.8 million square meters of dwellings divided into 100 small districts of 3,000-10,000 persons each, grouped by fours and fives into larger residential districts of 30,000-50,000 persons. The basic housing units will be buildings containing 1-room to 3-room apartments. The reconstruction plan spans 4 years (1979-1982). As of February 1980, 5.09 million

[continuation of DIZHEN ZHANKIAN [SEISMOLOGY FRONT] No 4, 26 Aug 80 pp 2-3]

square meters of buildings has been constructed, including 2.16 million of residential buildings. Many of the residential buildings are 4 and 5 stories. Eight design organizations are involved in earthquake-resistant design. Four major design types are: "poured interior, hung exterior," "poured interior, masonry exterior," "brick and mortar column construction, and "framing with light panels." In 1980, the critical year of the reconstruction, 3 million square meters of construction, including 2.3 million square meters of residential buildings, is to be completed.

AUTHOR: LIU Lijun [0491 7812 7786]

ORG: None

TITLE: "An Alarm on the Conjunction of the Nine Planets"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 4, 1980 pp 20-22

ABSTRACT: In 1982 (approximately 9 March), all nine planets in the solar system will be roughly in line, an event which occurs approximately once every 179 years. In a 1974 book, J. R. Gribbin and Stephen Plagemann suggested that this event would be accompanied by solar activity and geophysical phenomena and would pose the danger of a major earthquake, particularly on the San Andreas Fault. The fact is that several planets, notably Mercury and Jupiter, cause solar tides and affect solar activity and the sunspot cycle. This solar activity could have a triggering effect on sensitive earth structures by leading to the flow of large numbers of charged particles from the sun to the earth, which would affect atmospheric circulation and structure; the movement of large air masses could lead to earthquakes. The prediction of a danger period in 1980-84 is to be taken seriously, as indicated by the following phenomena: a very high number of sunspots in November 1979; a speeding up of the earth's rotation in 1979; a rare upsurge of

[continuation of DIZHEN ZHANXIAN [SEISMOLOGY FRONT] No 4, 1980 pp 20-22]

floods in the Los Angeles vicinity; a shift of more than 24 cm in the position of Pasadena since April 1979; increased radon levels in deep wells in California for the first time; and earthquakes of magnitude 6 and above along the San Andreas Fault. Although there was no major earthquake activity in China in 1801-1805, when the planets were lined up previously, there were major quakes 179 years before that, in 1622-1626. Although currently China is in a period of low earthquake activity, there is reason for vigilance.

AUTHOR: HU Yu liang [5170 3022 5328], CHEN Xiancheng [7115 3759 4453]

ORG: None

TITLE: "A Brief Discussion of Microseisms in Hunan"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 4, 26 Aug 80 pp 32-34

ABSTRACT: Hunan is an area of China in which earthquakes are uncommon. But many minor earthquakes have been observed in three areas: Cili, Lianyuan and Shaodong. The earthquakes in Cili were of magnitude 1.0-2.3 but had intensities up to 5; those in Shaodong were of magnitude 0.7-2.8 with intensities up to 6. In both cases they were associated with newly-built reservoirs. Analysis of the geology of the regions of their occurrence indicates that they resulted from seepage of water from newly-filled reservoirs into karst formations, thus reducing the friction in unstable structures. The Lianyuan earthquakes began in 1973, had magnitudes up to 3 and were of intensities up to 5-6. Analysis of their occurrence indicates that they resulted from withdrawal of water from the Qiaotouhe mine.

AUTHORS: LUO Guangwei [5012 0342 0251], SHI Xizhong [4258 6932 1813]

ORG: None

TITLE: "Rock Fracture Experiments With Radium and Thorium Emanations"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 4, 26 Aug 80 pp 38-39

ABSTRACT: Radon and thorium emanations picked up by an air current when rock samples were subjected to uniaxial fracture were measured. When a specimen of Badaling granite was subjected to rapid fracture, there was an abrupt jump in radioactivity. When another Badaling granite sample and a Tianshan granite sample were subjected to slow fracture, increases in emanations began when small fractures appeared and continued after the main fracture. The Tianshan sample was cemented together, which decreased the rate of emanations. When it was again subjected to pressure, there was a larger increase at the time of appearance of small cracks than on the previous occasion. The results obtained with a sample of cement with radon sealed into cavities in it were similar to those for natural samples. The results are suggestive of the rise in radon content of underground water before and after earthquakes.

AUTHOR: QIN Bingyi [4440 3521 3354]

ORG: None

TITLE: "Subsurface Water Anomalies Before the Wuyuan Earthquake"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 4, 26 Aug 80 p 40

ABSTRACT: The subsurface water-bearing layer, 1-2 meters below the surface, in the vicinity of Wuyuan, exhibited some anomalies in the period preceding the 1979 earthquake. Starting on 5 August the water in some wells showed a rapid rise (2 cm a day as compared with 0.2 cm normally) until 20 August, when a pattern of areas of high water levels and low water levels in the vicinity of Wuyuan could be seen on the map. Between 20 August and 25 August (the date of the earthquake) this rather broken-up pattern shifted to a better-defined one, in which certain circumscribed areas had depressed water levels while the surrounding area had raised water levels. In the four hours before the earthquake the water wells showed rapid up and down fluctuations of water level. At the time of the quake, water spurted out of the wells in one location. After the earthquake, the water in some wells was disturbed, bubbled or showed rapid up and down motion.

AUTHOR: WANG Wanqing [3769 5502 7230]

ORG: None

TITLE: "Anomalies in Oil and Water Wells and the Tangshan Earthquake"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 4, 1980 pp 41-43

ABSTRACT: Bin County, Shandong Province, has a complicated fault structure resulting from the interaction of a number of fault blocks. An examination of the behavior of oil wells in various oilfields located in faulting areas showed anomalies in 7 of them related to the Tangshan earthquake. Three wells (Nos 88, 101 and 102) showed sharp peaks in output within a month before the earthquake. One well (No 278) showed a sharp peak in the oil-gas ratio in April and July of 1976. There was a sharp increase in the water content of the oil produced by one well (No 285) in July. Finally, one well (4-Xi4-10) showed a decrease in the rate of change of static pressure, starting in March 1976 and achieving a plateau in June which persisted until October before the static pressure again began to change more rapidly.

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